

Incorporating Test and Evaluation into DoD Acquisition Contracts

1. Introduction

1.1 Purpose

This guide is designed to help the Department of Defense (DoD) and industry test and evaluation (T&E) professionals identify T&E items to consider for inclusion when drafting a statement of objectives (SOO), a statement of work (SOW), and a request for proposal (RFP), and during solicitation and contract execution. This guide presumes the reader has an understanding of T&E and the DoD systems acquisition processes as described in DoD Instruction 5000.02 (DoDI 5000.02) (Reference (a)) and the Defense Acquisition Guidebook (DAG) (Reference (b)), particularly, DAG Chapter 9, Integrated Test and Evaluation. This guide follows some of the content of the DoD Guide for Integrating Systems Engineering into DoD Acquisition Contracts (Reference (c)) and T&E topics and issues. This guide is for information purposes only.

This guide is structured to address generic T&E items common across DoD Components. Components may have specific T&E direction and guidance that each deems necessary for its acquisition programs. Most contracts begin at Milestone (MS) B—program initiation. However, a contract may be required prior to MS B for competitive prototyping. Programs may be required to implement acquisition strategies requiring a technology phase in which two or more competing teams will produce prototypes of the system or key system elements. Consequently, the SOO, SOW, and RFP are needed for prototyping contracts. These documents are essentially the same as those described in this guide for MS B.

The T&E guidance is based on programs that implement an acquisition strategy in which the development and testing have a single prime contractor. This is one of many DoD contracting strategies. Some project/system acquisitions will have different contracts. For example, Department of the Navy warship and combat system acquisition category programs may contract the engineering and production work to other Government and industry organizations for risk mitigation of the prime contract work. Regardless of the contract type, the important thing is to consider T&E requirements in the context of the contract. The program manager (PM) can tailor the T&E guidance to fit his or her particular situation or approach.

This guidance is based on the sequenced development process of a SOO, SOW, and the RFP leading to a contract. The underlying T&E considerations also apply to a rapid acquisition and fielding process, although the rapid process requires a much more focused T&E strategy and approach based on performance of key system capabilities and safety. The T&E strategy, including modeling and simulation (M&S), is an event-driven T&E approach linking key decisions in the system life cycle to knowledge from developmental and operational evaluations and outlines the test methodologies to obtain the data for evaluation. The T&E approach is an event-driven plan that identifies general or, when known, specific T&E techniques that contributes to capability maturation through discovery of performance levels and deficiencies including decision sequences and corrective action periods (CAPs). The strategy for T&E includes as much T&E information as is known at the time of development. The T&E strategy is captured in the approved test and evaluation strategy (TES) document/test and evaluation master plan (TEMP) at milestones and focuses on the T&E events and activities expected in the technology development (TD) phase. The TEMP includes as much information as is known at the time of development. The TEMP is a Government document required prior to MS B and is typically not a contractual compliance document for inclusion in the RFP but is available in the program's document library for reference.

The primary theme to remember is that if a T&E item or requirement is not in the SOW, it probably will not be in the RFP, and if it is not in the RFP, it probably will not be in the contract. If it is not in the contract, *do not expect to get it!*

The T&E community consists of a broad range of personnel who perform a wide variety of T&E functions. When this guide refers to T&E personnel, ensure that the appropriate type(s) of T&E personnel with the appropriate T&E skills to provide the required support are cited. For example, when addressing the translation of critical technical parameters (CTPs) into contract specifications, this guide recommends that

persons skilled in research, development, and T&E be assigned to write and/or review those parts of the contractual documents. When addressing contractor support needed for operational test and evaluation (OT&E), the OT&E personnel from the operational test agencies (OTAs) should be enlisted to write and/or review those parts of the contractual documents.

The Lead for T&E is a generic term referring to T&E personnel who lead the effort for T&E review, coordination, etc., for the integrated test team (ITT) or program office when T&E portions of contractual documents are being developed. The Lead for T&E may be one or several subject matter experts (SMEs) who bring specific T&E skills to the table.

1.2 Guide Organization

This guide contains the following four sections, organized to help the user focus on specific segments of the contract development process:

- Section 1. Introduction. This section covers the guide's purpose, organization, and definitions and includes an overview of the Defense Federal Acquisition Regulation Supplement (DFARS) (Reference (d)).
- Section 2. Pre-Solicitation. This section discusses the importance of including the T&E contracting requirements, including the T&E strategy and approach in the acquisition plan, TEMP, incentives, RFP/contract incentive structure, SOO, and ultimately in the SOW.
- Section 3. Solicitation. This section summarizes the source selection focus for those T&E items in the technical, management, cost, proposal risk, and past performance elements of the source selection. The section highlights proposal documents that evolve into the negotiated contract.
- Section 4. Contract Execution. This section addresses the transition to execution, contract oversight, and administration, and Defense Contract Management Agency (DCMA) support. The section discusses the key actions immediately following contract award.

1.3 Definitions

Following are definitions for the principal terms used in this guide.

1.3.1 Contract

contract is a mutually binding legal relationship obligating the seller to furnish the supplies or services (including construction) and the buyer to pay for them. It includes all types of commitments that obligate the Government to an expenditure of appropriated funds and that, except as otherwise authorized, are in writing. In addition to bilateral instruments, contracts include (but are not limited to) awards and notices of awards; job orders or task letters issued under basic ordering agreements; letter contracts; orders, such as purchase orders, under which the contract becomes effective by written acceptance or performance; and bilateral contract modifications. Contracts do not include grants and cooperative agreements (Federal Acquisition Regulation (FAR) 2.101 (Reference (e))).

1.3.2 Contract Data Requirements (CDRL)

The CDRL (DD Form 1423) lists the contract data requirements authorized for a specific acquisition and becomes part of the contract. In addition, the CDRL may list packaging, packing, and marking requirements; delivery requirements; and work directed through special contract requirements. For more information on DD Form 1423 see <http://dtic.mil/whs/directives/infomgt/forms/eforms/dd1423.pdf>.

1.3.3 Contractor Roles in T&E

The contractor will plan and execute the majority of design testing that transitions technology from

science and technology efforts into functional capabilities desired by the military, as well as qualification testing of subcomponent parts and products from vendors that will make up the system delivered to the military. It will be necessary for Government testers to understand the contractor testing processes and methods to assess appropriate amount of visibility into those test activities as well as determine data collection and transfer that will benefit Government testers to avoid redundant or unnecessary testing. Experienced testers must determine cost/benefit ratios in visibility into proprietary activity and data transfer to the Government. Additionally, consideration must be given to near end-state evaluations during operational testing (OT).

1.3.4 Contract

A DID is a description of a data item that is to be put on the contract. Each data item will have its own DID. There are three types of DIDs: standard, tailored, and one-time. For more information, see http://www.dsp.dla.mil/APP_UIL/displayPage.aspx?action=content&accounttype=displayHTML&contentid=22

- **Standard DID.** A standard DID is one that is used "as-is". A standard DID is used if it exactly describes the information requirement that needs to be put on contract.
- **Tailored DID.** A tailored DID is one in which not all of the requirements quoted in a standard DID need to be put on contract. The standard DID is "tailored down"; the scope of the DID is reduced by removing words, paragraphs, or sections. A DID can be tailored only by removing existing requirements from a standard DID. New requirements cannot be added to a standard DID. Many times, DIDs are tailored to accept a contractor's data format.
- **One-Time DID.** A one-time DID is used when a data requirement cannot be met by using a standard or tailored DID. These DIDs are written to acquire specific information on a specific contract.

1.3.5 Integrated Master Plan (IMP)

The IMP is an event-based plan consisting of a hierarchy of program events, with each event supported by specific accomplishments and each accomplishment associated with specific criteria to be satisfied for its completion.

1.3.6 Integrated Master Schedule (IMS)

The IMS is an integrated, networked schedule containing all the detailed discrete work packages and planning packages necessary to support events, accomplishments, and criteria of the IMP. A good source for more details on both the IMP and IMS is the Integrated Master Plan and Integrated Master Schedule Preparation and Use Guide (Reference (f)).

1.3.7 Lead for T&E

Lead for T&E is a generic term referring to appropriate T&E personnel who lead the development, writing, coordination, and review efforts for the ITT or program office for the T&E portions of contractual documents. The Lead for T&E may be one or several SMEs who bring specific T&E skills to the table.

1.3.8 Performance Work Statement

The PWS is a SOW for performance-based acquisitions that describes the required results in clear, specific, and objective terms with measurable outcomes. See Subpart 2.101 of Reference (e).

1.3.9 Proprietary Right

Proprietary right is a broad term used to describe data exclusively owned by the contractor. These data could be intellectual property or financial data, for example. A contractor may use the term in a proposal to protect the contractor's sensitive information from disclosure, but the term is not a category of rights applicable to technical data, to include T&E data under all contracts.

1.3.10 Request for Proposal (RFP)

The RFP is a solicitation used in negotiated acquisition to communicate Government requirements to prospective contractors and to solicit proposals.

1.3.11 Statement of Objectives (SOO)

The SOO is the portion of a contract that establishes a broad description of the Government's required performance objectives. The SOO is a Government-prepared document incorporated into the solicitation that states the overall performance objectives. It is used in solicitations when the Government intends to provide the maximum flexibility to each offeror to propose an innovative approach. See Subpart 2.101 of Reference (e).

1.3.12 Statement of Work (SOW)

The SOW is that portion of a contract that establishes and defines the work to be performed by the contractor, and it may incorporate specifications, DIDs, or other cited documents. The SOW should be consistent with all "promises or claims" made in the proposal. A very good reference for SOOs, SOWs, and PWSs is the Defense Acquisition University (DAU) online Continuous Learning Module (CLM) 031, "Improved Statement of Work" (Reference (g)).

1.3.13 System Performance Specification (SPS)

The SPS or equivalent contents will be incorporated into the contract. The SPS describes the operational characteristics desired for an item without dictating how the item should be designed or built. The Joint Capabilities Integration and Development System (JCIDS) documents (i.e., capability development document (CDD), operating and enabling concepts) are the basis in developing the system specification. These documents are key to developing sound contractual documents. A complete understanding of the system, verifying system performance, and validating T&E results will ultimately be based on meeting JCIDS requirements.

1.3.14 Test and Evaluation Master Plan

The TEMP documents the overall structure and objectives of the T&E program. It provides a framework to generate detailed T&E plans and documents schedules and resource implications associated with the T&E program. The TEMP identifies the necessary developmental test and evaluation (DT&E), OT&E, and live-fire test and evaluation (LFT&E) activities. It relates program schedule, test management strategy and structure, and required resources to critical operational issues (COIs), CTPs, objectives, and thresholds documented in the CDD, evaluation criteria, and milestone decision points. The TEMP does not relieve the contractor of any contractual obligations. It serves as an indicator of Government expectations and should complement, not contradict, specifications and contractual language. The Government TEMP should be shared with industry as appropriate. Sharing the TEMP pays dividends and should be a common practice as appropriate to contractual T&E responsibilities (e.g., a single prime contractor responsible for all T&E).

1.3.15 Test and Evaluation Strategy (TES)

The TES is an early T&E planning document that describes the T&E activities starting with TD and continuing through engineering and manufacturing development (EMD) into production and deployment. Over time, the scope of this document will expand. The TES will evolve into the TEMP due at MS B. The TES describes, in as much detail as possible, the risk-reduction efforts across the range of activities (e.g., M&S, DT&E, OT&E, etc.) that will ultimately produce a valid evaluation of operational effectiveness, suitability, and survivability before full-rate production and deployment. It is a living document and should be updated as determined by the T&E working integrated product team (WIPT) during the TD phase. Its development will require early involvement of testers, evaluators, and others as a program conducts pre-system acquisition activities, especially prototype testing. The TES should be consistent with and complementary to the systems engineering plan (SEP).

1.3.16 Title 10, United States Code (U.S.C.)

Title 10 (Reference (h)), section 2399, Operational Test and Evaluation of Defense Acquisition Programs, paragraph (d), Impartiality of Contractor Testing Personnel, states that in the case of a major defense acquisition program, as defined in Reference (h), sections 139, 2399, 2430, and 2302(5), no person employed by the contractor for the system being tested may be involved in the conduct of OT&E, establishing OT&E criteria, or OT&E evaluation. The contractor can be tasked to provide technical understanding of test incidents, logistics support and training, support to test failure analysis, and unique software and instrumentation support. The limitation does not apply to the extent that the Secretary of Defense plans for persons employed by that contractor to be involved in the operation, maintenance, and

support of the system being tested when the system is deployed in combat.

NOTE: System contractors are those who design and build the system, and support contractors are those who work for the Government in support of the acquisition and T&E of those systems.

System contractors may be beneficial in providing logistic support, test failure analyses, and software and instrumentation support that could increase the value of unprocessed OT&E data. Clear explanations of how system contractor support will be used and the mitigation of possible adverse effects must be described in the TEMP and OT&E plans to ensure no violation of the prohibitions in title 10, section 2399. Consider using the system contractor capabilities and skills in the following specific areas to support dedicated OT&E:

- Performing maintenance and support actions of the same type that the system contractor would be expected to perform as part of interim contractor support of contractor logistics support when the system is fielded.
- Conducting and reporting analyses of test failures to assist in isolating causes of failure but excluding participation in data scoring and assessment conferences.
- Providing and operating system-unique test equipment, test beds, and test facilities that may include software, software support packages, instrumentation, and instrumentation support. Full aircraft mission simulator systems are examples.
- Providing logistics support and operator training as required in the event such services have not yet been developed and are not available from the Military Department or Defense Agency having responsibility for conducting or supporting OT&E.
- Providing data generated prior to the conduct of OT&E, if deemed appropriate and validated by the OT organization, to ensure that critical issues are sufficiently and adequately addressed.

1.3.17 Work Breakdown Structure(WBS)

The WBS is a fundamental project management technique for defining and organizing the total scope of a project, and delineates and segregates the technical elements to report costs to support technical management decisions and progress. A well-designed WBS describes planned outcomes instead of planned actions. The WBS needs to be consistent with the T&E program and the way in which it is conducted, or it may be difficult to evaluate. A very good reference for WBS information is the DAU online CLM 013, "Work Breakdown Structure (WBS)" (Reference (g)).

1.4 Defense Federal Acquisition Regulation Supplement (DFARS)

1.4.1 Using DFARS

Guide users are not expected to have the same knowledge as contracting officers (KOs) but should understand the purpose of DFARS and where to look for specific guidance and information. DFARS and a Service's or Defense Agency's contracting supplement provide specific clauses that must be included in the contract, and they may identify items for delivery. What is expected to be delivered is the main T&E focus, especially contractual language on proprietary/intellectual rights and data access and sharing.

1.4.2 DFARS Requirements

The DFARS remains the source for regulation and implementation of laws as well as DoD-wide contracting policies, authorities, and delegations. In other words, DFARS will answer these questions:

What is the policy? and What are the rules? The DFARS Procedures, Guidance, and Information Website (Reference (d)) connects the acquisition community to available background, procedures, and guidance and answers these questions: *How can I execute the policy? and Why does this policy exist?*

1.4.3 Federal Acquisition Regulation (FAR) Part 16

FAR Part 16 (Reference (e)) , Service Supplements, and Individual Service Award Fee Guides provide additional information on types of contracts and incentives that may be used (FAR Subpart 16.4 (Reference (e))); DFARS Subpart 216.4 (Reference (d)); Army Federal Acquisition Regulation Supplement Subpart 5116.4; Air Force Federal Acquisition Regulation Supplement Subpart 5316.4; Air Force Award Fee Guide (Reference (i)); Army Award Fee Guide (Reference (j)); Navy/Marine Corps Award Fee Guide (Reference (k)). To search specific FARs go to <http://farsite.hill.af.mil>.

1.5 Acquisition Process

This guide focuses on contract development leading to contract award. Traditionally, program designation and contract award are at Milestone B. However, regardless of the acquisition phase, some contracts may be awarded prior to Milestone B, and the T&E contractual considerations described in this guide still apply. The five major phases of the government acquisition process are defined in DoDD 5000.01, The Defense Acquisition System, and DoDI 5000.02, Operation of the Defense Acquisition System. Figure 1-1 depicts the current Defense Acquisition Management System.

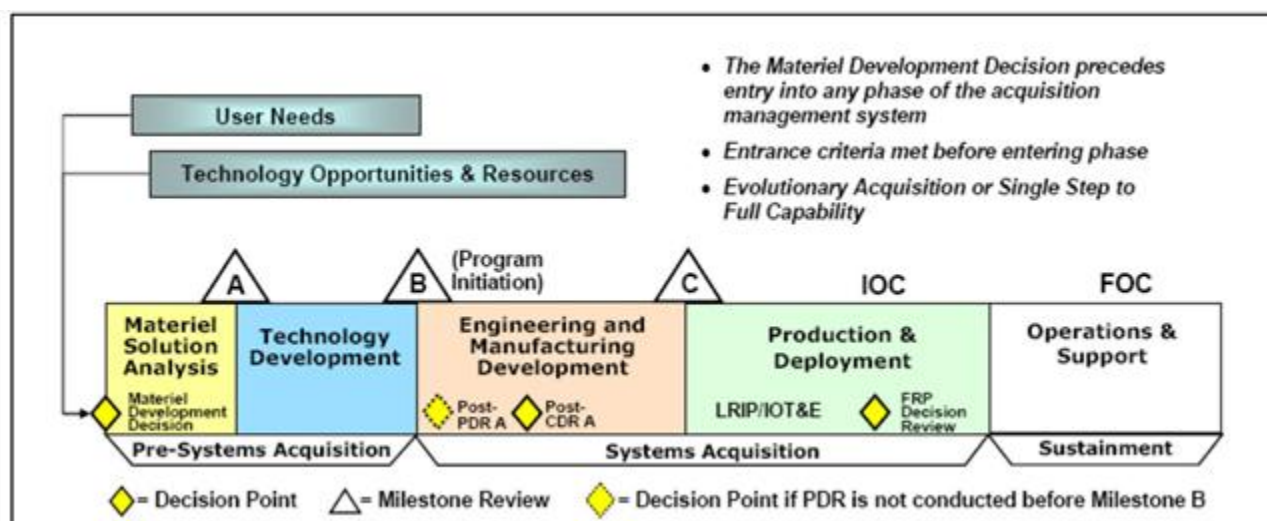


FIGURE 1-1 The Defense Acquisition Management System

Figure 1-2 is a simplified illustration of the above acquisition process depicting the associated contracting steps. It begins when the Warfighter identifies the need (See Chairman of the Joint Chiefs of Staff Instruction 3170.01G (Reference (m))) to the acquisition activity, which then translates that need into a requirement and purchase request. The KO solicits offers from industry and awards a contract. In the final step, the contractor closes the loop by delivering supplies and services that satisfy the Government need. Be aware that there may be a separate RFP for each phase of the acquisition process (e.g., RFP for TD, RFP for EMD, RFP for low-rate initial production, and RFP for production). During acquisition planning, primary responsibility rests with the acquisition activity.

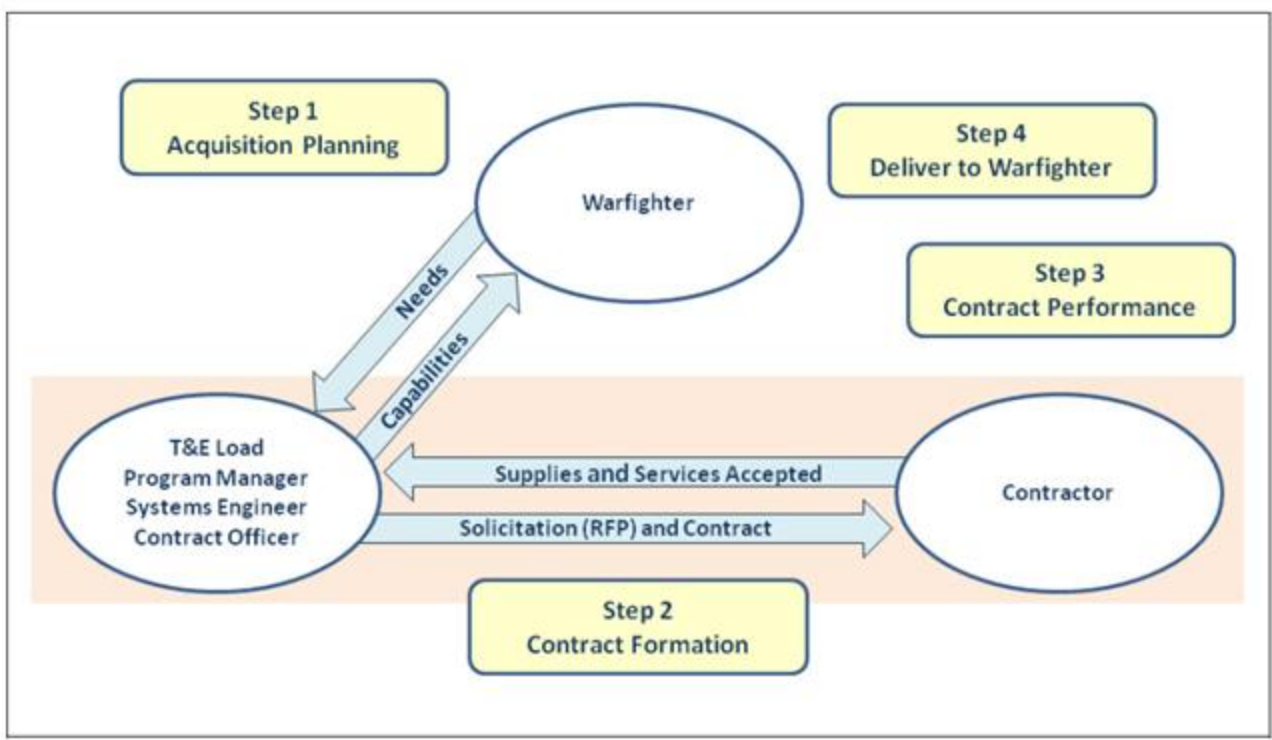


FIGURE 1-2 Simplified Government Acquisition Process

Acquisition planning is the process of identifying and describing contract requirements and determining the best method for meeting those requirements (e.g., business, program acquisition strategy (AS)), including solicitations and contracting. Acquisition planning focuses on the business and technical management approaches designed to achieve the program's objectives within specified resource constraints. The AS usually drafted in the TD phase of acquisition, is required and approved by the Milestone Decision Authority and provides the integrated strategy for all aspects of the acquisition program throughout the program life cycle. Earlier developmental activities are guided by the technology development strategy.

The TES and then the TEMP provide the approach on the content, management, and focus of the T&E aspects of the acquisition program. The acquisition plan provides more specific plans for conducting the acquisition and is approved in accordance with agency procedures, see Part 7 of Reference (e). A source selection plan (SSP) specifies the source selection organization, evaluation criteria, and procedures, and is approved by the KO or other Source Selection Authority. All of these documents guide RFP development. Other companion program artifacts include the capabilities documents (initial capabilities document (ICD), CDD, and the capability production document (CPD)); risk management plan (RMP); technology readiness assessment; information support plan; SEP; product support strategy; test plan; and support and maintenance requirements. A good source for policy and guidance is DAU's Acquisition Community Connection Practice Center Website (Reference (g)).

The program team must have strong technical, contracting, and T&E leadership as the program moves through its steps in contract formulation and execution. It is imperative to have the KO involved in the program acquisition planning process as early as possible.

1.6 Contracting Process

The PM, chief or lead systems engineer (SE), KO, Lead for T&E, and combat developer must work together to translate the program's requirements document, AS document or acquisition plan, and

associated technical documents into a cohesive, executable contract, as appropriate. Table 1-1 identifies some typical acquisition process activities, starting from requirements identification through contract close-out, and capturing lessons learned and the role of the Lead for T&E who provides the T&E input, review, and coordination.

A wide selection of contract types is available to the Government and contractors to provide needed flexibility in acquiring the large variety and volume of supplies and services required by Defense Agencies. See Part 16 of Reference (e) for further information. Contract types vary according to:

- The degree and timing of the responsibility assumed by the contractor for the costs of performance.
- The amount and nature of the profit incentive offered to the contractor for achieving or exceeding specified standards or goals.

The contract types are grouped into two broad categories: fixed-price contracts (see Subpart 16.2 of Reference (e)) and cost-reimbursement contracts (see Subpart 16.4 of Reference (e)). The specific contract types range from firm-fixed-price, in which the contractor has full responsibility for the performance costs and resulting profit (or loss), to cost-plus-fixed-fee, in which the contractor has minimal responsibility for the performance costs and the negotiated fee (profit) is fixed. In between are the various incentive contracts (see Subpart 16.4 of Reference (e)), in which the contractor's responsibility for the performance costs and the profit or fee incentives offered are tailored to the uncertainties involved in contract performance.

TABLE 1-1 Acquisition Process Activities and the T&E Role

| Typical Acquisition Process Activities | T&E Role |
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| 1. Identify overall procurement requirements and associated budget. | Lead for T&E determines testability of requirements and describes the Government's T&E needs and any constraints on the procurement |
| 2. Identify T&E actions required to successfully complete T&E and performance milestones. | Lead for T&E defines the T&E strategy and approach and required T&E efforts. In consultation with or at the direction of appropriate T&E personnel, describes the Government's T&E needs consistent with the program's AS or acquisition plan. This effort should include defining contractor and Government testing, identification of test and training ranges of the test equipment and facilities, capabilities designated by industry and academia, unique instrumentation, threat simulators, targets, and M&S. Certain test events such as initial operational test and evaluation (IOT&E), interoperability certification, information assurance (IA), DoD Information Assurance and Certification Accreditation Process (DIACAP) certification and accreditation (C&A), and independent verification and validation may have to involve independent SMEs. |
| 3. Collaborate on acquisition and T&E strategies. | The PM, combat developer, and appropriate T&E personnel collaboratively develop the acquisition and T&E strategies so that users' capability-based operational requirements (i.e., CDD, concept of operations (CONOPS)) are correctly translated into accurate contractual terms and actions that give the highest probability of successful outcome for the Government. Contracted events must provide for sufficient time to execute all regulatory and statutory T&E activities and reporting. |
| 4. Identify the | PM, SE, and Lead for T&E identify the RAM and RPP requirements for a robust |

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| reliability, availability, and maintainability (RAM) requirements and the need for a reliability program plan (RPP). | RAM program, which includes reliability growth planning as an integral part of product/system design, development, and T&E consistent with technical maturity and the SEP. In addition, in accordance with Directive-Type Memorandum (DTM) 11-03 (Reference (n)), the sustainment characteristics of the materiel solution resulting from the analysis of alternatives (AoA) and the CDD, sustainment key performance parameter (KPP) thresholds will be translated into reliability and maintainability (R&M) design requirements and contract specifications. The strategies shall also include the tasks and processes to be stated in the RFP that the contractor will be required to employ to demonstrate the achievement of reliability design requirements. The tasks and processes will be compared against the plan (track/plan). Consider elements of T&E necessary for decisions points that will best balance RAM maturity with capability thresholds and objectives. |
| 5. Perform market research to identify potential sources. | PM and Lead for T&E identify programmatic and T&E information needed and assist in evaluating the search results for each area. See Part 10 of Reference (e) for sources of market research, including trade studies, limited demonstration test results, and procedures. Small businesses must be considered. |
| 6. Identify Human systems integration (HSI) and usability test criteria. | PM and Lead for T&E, in coordination with HSI SMEs, develop test criteria for HSI requirements explicitly stated in capability requirements, or derived from capability requirements and HSI guidance in MIL-STD-46855A (Reference (o)), MIL-STD-1472F (Reference (p)), and related DoD and DoD Component guidance. HSI may impact, and be impacted by, requirements and specifications in the areas of manpower and personnel planning; training; environmental, safety, and occupational health provisions; human factors engineering; and survivability and habitability provisions. |
| 7. Document the role of M&S. | PM, with the Lead for T&E, identifies the role M&S will contribute to the acquisition process. This effort should be consistent with the engineering plan for M&S. Address the need for an M&S support plan if required per DoD component direction. |
| 8. Prepare a purchase request. | PM and Lead for T&E ensure that the specific programmatic and T&E needs are defined clearly. Consider the needs for testing commercial off-the-shelf (COTS) systems as well as any possible contractual implications regarding testing associated with Part 12 of Reference (e). A purchase request should include product descriptions; priorities, allocations, and allotments; architecture; COTS, Government-furnished information (GFI), or Government property or equipment; IA and security considerations; and required delivery schedules. |
| 9. Determine contractor OT&E support. | The program team works together to ensure that FAR and DFARS requirements are met while tailoring the acquisition strategy and approach. The PM is owner of the program acquisition strategy and planning. The Lead for T&E develops and reviews (and PM approves) the T&E strategy and approach with the PM and lead engineer. Acquisition streamlining approach and requirements include budgeting and funding, contractor versus Government performance, management information requirements, environmental and safety considerations, offeror expected skill sets, and milestones. These are addressed in the AS document or acquisition plan. |
| 10. Identify acquisition streamlining approach and | In conjunction with the OTAs, the PM and Lead for T&E will define the degree of contractor support to be provided for OT&E. There are five permissible types of contractor OT&E support: (1) performing maintenance and support actions of the same type that the system contractor would be expected to perform as part of |

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| requirements. | interim contractor support or contractor logistics support when the system is deployed in combat; (2) conducting and reporting analyses of test failures to assist in isolating causes of failure (but excluding participation in data scoring and assessment conferences; (3) providing and operating system-unique test equipment, test beds, and test facilities that may include software, software support packages, instrumentation, and instrumentation support; (4) providing logistics support and training as required in the event that such services have not yet been developed and are not available from the Military Department or Defense Agency responsible for conducting or supporting the OT&E; and (5) providing data generated prior to the OT, if deemed appropriate and validated by the independent OTA, to ensure that critical issues are sufficiently addressed. |
| 11. Plan the requirements for the contract SOO/SOW specification, and T&E reviews in support of the technical reviews, test readiness reviews (TRRs), certifications for OT&E readiness, DIACAP C&A, acceptance requirements, and schedule. | Lead for T&E is responsible for developing the T&E contents of the SOO/SOW and supporting the technical reviews, TRRs, certifications for OT&E readiness, and DIACAP C&A. |
| 12. Plan and conduct Industry Days as appropriate (See section 2.5). | PM and Lead for T&E support the KO in planning the meeting agenda to ensure that T&E needs are discussed. |
| 13. Lead for T&E provides resource, schedule, and performance estimates by developing the T&E portion of the WBS or work package based on preliminary system specifications; determines T&E event-driven criteria for key technical and readiness reviews; and determines what T&E artifacts are baselined. The | Lead for T&E identifies all T&E CDRL intellectual property requirements, if any, and T&E performance expectations. |

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| PM, Lead for T&E, and lead engineer advise the KO in developing the metrics/criteria for an incentive mechanism. | |
| 14. Identify T&E data requirements | Lead for T&E identifies all T&E CDRL intellectual property requirements, if any, and T&E performance expectations. This includes defining data that the contractor will supply to support integrated developmental testing (DT)/OT. |
| 15. Establish warranty requirements, if applicable. | Lead for T&E works with the lead engineer and the KO on determining cost-effective warranty requirements, such as addressing and correcting defects (hardware, software, documentation) as part of the warranty. |
| 16. Prepare an SSP and RFP (for competitive negotiated contracts). | Lead for T&E provides input to the SSP per the SOO/SOW, Section L (instructions, conditions, and notices to offerors or respondents), and Section M (evaluation factors for award) of the RFP. |
| 17. Conduct source selection and award the contract to the successful offeror. | Lead for T&E participates on source selection teams. |
| 18. Implement requirements for a contract administration office memorandum of. | Lead for T&E provides input regarding the T&E support efforts for inclusion in the memorandum of agreement (MOA) and/or letter of delegation. The MOA should define product/system performance requirements and/or attributes. |
| 19. Monitor and control contract execution for compliance with all requirements. | PM, Lead for T&E, and program team perform programmatic and T&E monitor and control functions as defined in the contract. They assist the earned value management (EVM) implementation by monitoring the criteria for completion of T&E events, activities, and delivered products. They also use T&E performance criteria in the incentive/award plan. |
| 20. Close out contract. | Contract close-out is mainly an accounting/ administration activity, but KO provides status updates to PM. Lead for T&E may have input regarding any T&E-related articles, such as M&S tools and final performance reports. |
| 21. Document T&E lessons learned. | Lead for T&E and contractor partner should be capturing, and adjusting as necessary, lessons learned as the T&E effort progresses through the acquisition process. The lessons learned should be provided to the PM as part of the T&E close-out process and final PM report, as appropriate, to the program sponsor, or as directed. |

1.7 Security Review, Public Release, and International Traffic in Arms Regulation (ITAR)

DoDI 5230.29, "Security and Policy Review of DoD Information for Public Release," implements policy in DoD Directive (DoDD) 5230.09, "Clearance of DoD Information for Public Release," and assigns responsibilities and prescribes procedures to carry out security and policy review of DoD information for public release. DoDD 5230.09 requires that a security and policy review be performed on all official DoD information intended for public release that pertains to military matters, national security issues, or subjects of significant concern to the Department of Defense. The program management office is typically the originator/owner of the weapon system classification guides. The PM, SE, KO, and Lead for T&E must work together to ensure documents have the proper control markings and that the public release process for T&E reports on the performance of contracted defense articles (at least in terms of unclassified export controlled test results) complete the security review process contained in DoDD 5230.09 and DoDI 5230.29.

The U.S. Government views the sale, export, and re-transfer of defense articles and defense services as an integral part of safeguarding U.S. national security and furthering U.S. foreign policy objectives. Authorizations to transfer defense articles and provide defense services, if applied judiciously, can help meet the legitimate needs of friendly countries, deter aggression, foster regional stability, and promote the peaceful resolution of disputes. The U.S., however, is cognizant of the potentially adverse consequences of indiscriminate arms transfers and, therefore, strictly regulates exports and re-exports of defense items and technologies to protect its national interests and those interests in peace and security of the broader international community. See Appendix A for additional information on Defense Export Controls and the International Traffic in Arms Regulation (ITAR).

2. Pre-solicitation

The contents of this section will help you focus on and consider the most important contractual T&E items as you formulate the T&E strategy and approach. The discussion is applicable whether you are preparing for a weapons system acquisition program; command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) system acquisition program; or automated information system acquisition program. A solid T&E strategy and approach foundation will facilitate the transition to the solicitation phase.

2.1 Planning

During the program life cycle, it is critical that the PM, SE, and T&E personnel recognize that early and consistent incorporation of T&E considerations and requirements begins at the onset of program planning during the materiel solutions analysis (MSA) and TD phases. The program acquisition strategy must be grounded in a technical approach with understandable, achievable, testable, and measurable performance requirements and reliability measures embodied in viable system solutions that are within cost and schedule constraints.

The PM and the program must be prepared to enter the EMD phase with cost, schedule, and expected system performance requirements balanced and synchronized. Important PM and team T&E considerations for possible use when beginning pre-solicitation activities are as follows:

- Ensure that program planning documentation, even in draft, such as the AS document or acquisition plan, AoA, TEMP, SSP, RMP, and the RFP are available, coordinated, and consistent. The SSP, RMP, and the resulting RFP should integrate the T&E policy directives and best practices from Government and industry.
- Ensure that the integrated T&E strategy and approach address the total life cycle of the program and consist of logically sequenced test events consistent with product or system development, demonstrated performance reviews, and satisfactory reliability metrics.

- Ensure that the specific test ranges/facilities and test support equipment are identified for each type of testing. Any shortfalls between the scope and content of planned testing with existing and programmed test range/facility capability must be identified with associated risk analysis. Ensure that any applicable requirements for OT&E are also addressed in addition to individual DT&E requirements.
- Incorporate T&E requirements in budgets and cost estimates in the program's T&E approach and achievable performance requirements, and the program's IMP, IMS, integrated master T&E schedule, and Earned Value Management System (EVMS). Program T&E cost and schedule realism must be supported by aggressive leadership, sound program planning, and timely application of resources along with execution of technical, T&E, and management processes. Ensure that operationally representative environments are available for system testing as well as OT to optimize integrated testing and efficiencies.
- Consider joint interoperability test command (JITC) interoperability and Net-Ready KPP certification. In addition, factor into the test strategy sufficient and early IA planning through the DoD guidance for DIACAP (Reference (q)) to ensure that operationally representative test environments and connectivity can be obtained.

2.2 Requirements

This guide addresses several kinds of requirements

2.2.1 System Performance Requirements

The chief or lead SE is responsible for deriving system performance requirements. The Lead for T&E is responsible for ensuring that these requirements are testable and measurable. The approved performance requirements are the backbone of the T&E strategy, approach, execution, and reporting.

The system performance requirements should be performance-based, and potential system solutions must be based upon mature technology and lie within program cost and schedule constraints. These performance requirements are documented in the acquisition program baseline (APB) and should be in the SOO and based on the operational requirements stated in the ICD, or the follow-on CDD and associated JCIDS documentation. The preliminary system specification may include some of the JCIDS documents (or extracts from them), such as operational and system architectural views and CONOPs. The program office may also provide portions of the JCIDS documentation as reference material to aid the offeror's understanding of the operational requirements. The preliminary specification in the RFP is a precursor to the SPS that represents the program's functional baseline to be placed on contract. The functional baseline in the SPS is the first critical technical baseline established at the start of EMD.

2.2.2 Operational Requirements

Operational requirements are those written by the warfighter, operator, or user to express needed capabilities. Performance requirements, derived from operational requirements, must be established that correlate with program costs and schedule. If approach, execution, and reporting are not balanced at the start of the EMD phase or program award, the program has a high probability of incurring cost increases and suffering schedule delays or worse, a deficient system.

2.2.3 Reliability Requirements

In accordance with Reference (n), PMs formulate a comprehensive R&M program using an appropriate reliability growth strategy to improve R&M performance until R&M requirements are satisfied. The lead DoD Component and the PM, or equivalent, prepare a preliminary RAM and cost rationale report in support of the MS A decision. The TES and the TEMP should specify how reliability will be tested and evaluated during the associated acquisition phase. Reliability growth curves (RGCs) should reflect the reliability growth strategy and be employed to plan, illustrate, and report reliability growth. An RGC should be included in the SEP at MS A and updated in the TEMP beginning at MS B. The RGC will be stated in a series of intermediate goals and tracked through fully integrated, system-level T&E events until the

reliability threshold is achieved. If a single curve is not adequate to describe overall system reliability, curves will be provided for critical subsystems with rationale for their selection. A method for identifying RGC risk is in Appendix F. It is highly recommended that reliability scorecards be included as part of proposals. Key for the T&E team is understanding all the stated and implied requirements and how to best test/evaluate those requirements. This understanding is based on sound analysis that uses integrated T&E, M&S, and a team composed of all stakeholders. The Lead for T&E ensures the T&E strategy and approach addresses system of systems (SoS) and joint T&E to the extent necessary to adequately demonstrate performance in the expected operational environment with realistic T&E events and schedule. The Lead for T&E along with test team members should develop a requirements/testability crosswalk matrix depicting how each requirement will be tested. Use the evaluation framework found in the TEMP as the basis for the matrix. See Chapter 9 of Reference (b).

2.3 TES and the AS Document/Acquisition Plan

The PM and Lead for T&E must recognize and emphasize the importance of a sound T&E strategy and approach to the program. The recognition begins with the statement of required capability, resulting in an approved system definition that provides a product meeting the user's needs. There is no —one size fits all approach for programs, but disciplined adherence to proven T&E processes and practices will lead to a sound T&E strategy and approach. When developing the T&E strategy and approach, consider that the single most important step for avoiding suitability failures is to ensure that programs are formulated to execute a viable systems engineering and T&E strategy from the beginning, including a robust RAM program that includes design for reliability (DfR) and for reliability growth and development.

The Government TES and TEMP are the foundation T&E documents supporting the acquisition strategy and the PM's program schedule, and contain key items to consider when developing the SOO, SOW, PWS, and RFP. The Government's T&E strategy and approach should describe what is to be accomplished. The offeror's integrated T&E approach provided in the proposal will expand on how the offeror intends to execute the integrated T&E program, applying its domain experience and corporate best practices. The Government TES, and then TEMP, should be prepared as early as possible to properly influence the acquisition process by providing a carefully planned T&E strategy and approach to meet the programmatic and operational needs.

This strategy and approach become very important if the acquisition strategy and engineering strategy employ incremental development and fielding. TES/TEMP development should begin in parallel with the analysis of operational requirements so the T&E strategy and approach are consistent with the required capability. The Government should share the draft TEMP and the draft preliminary system specification with industry representatives to obtain their perspectives on the T&E strategy and approach. In addition to the TES/TEMP, the program requires supporting documents such as the SEP, AS, RPP, SSP, and ICD/CDD. These program documents capture information important to developing the T&E strategy and approach.

2.3.1 General

During the pre-solicitation phase of a program, the T&E process should be applied to set the stage for future expectations. The Government is in the leadership role in this stage, and early industry input can provide critically important insights into the technical and performance challenges, program technical approach, and key business motivations. Lessons learned from past programs suggest the pre-solicitation process can be very productive when a highly collaborative environment is created, involving the user, acquisition community, and industry personnel. The program should ensure early and frequent industry involvement while developing the T&E strategy and approach and the formulation and development of the system performance requirements. Industry can provide important insight into the T&E and business aspects of the program. The Government should include its T&E strategy and approach in the draft RFP to foster this synergism and interaction. Notwithstanding the desire to work with industry and obtain insight on T&E solutions from potential contractors, Government personnel should be aware that individual contractors will have potential biases that will intrude into their recommendations. The Government, therefore, should seek independent counsel from numerous sources to minimize the

impact of any specific contractor's potentially biased recommendations.

2.3.2 Formula-Type Incentives and Award Fees

There are two broad types of incentive contracts: (1) those that rely on the application of predetermined, formula-type (objective) incentives; and (2) award-fee contracts, in which the award amount is determined by the Government's (subjective) evaluation of the contractor's performance.

Both types of incentive contracts are designed to achieve specific acquisition objectives by establishing reasonable and attainable targets that are clearly communicated to the contractor, including appropriate incentive arrangements designed to motivate contractor efforts that might not otherwise be emphasized and discourage contractor inefficiency and waste. Most incentive contracts include only cost incentives, which take the form of a profit or fee adjustment formula and are intended to motivate the contractor to effectively manage costs. See Subpart 14.4 of Reference (e). No incentive contract may provide for other incentives without also providing a cost incentive or constraint.

In developing appropriate incentives, the Government must take care to provide incentives only for the desired behavior, not for actions that are counterproductive or for requirements that the contractor would otherwise be obligated to perform. Incentive increases or decreases are applied to performance targets rather than minimum performance requirements. Incentives are directly linked to expectation setting, understanding, and interactive management. Incentives and motivations must support the overall program needs and not weaken a specific aspect of the program. If the contractor develops an internal test capability for a capability that already exists within the Major Range and Test Facility Base (MRTFB), there must be clear evidence that it is in the best interest of the Government and program by conducting a cost-benefit analysis (CBA).

2.3.2.1 Formula-Type Incentives

Formula-type incentives are based on a single criterion or multiple criteria that can be objectively measured. The Department is increasingly moving toward incentives based on objective criteria, according to Reference (r): —It is the policy of the Department that objective criteria will be utilized, whenever possible, to measure contract performance. II Also see the memorandum from the Under Secretary of Defense for Acquisition, Technology, and Logistics Memorandum (Reference (s)).

For example, a cost incentive would be that the additional cost for every dollar over the target cost of the contract would be split between the Government and the contractor based on a fee adjustment formula (i.e., share ratio). Including incentives for T&E excellence in addition to the cost incentive can be an important aspect of the program acquisition strategy and should be an explicit consideration for any development or test program contract. The incentive strategy must be balanced with the program cost, schedule, and performance requirements reflected in the program documentation. Incentives reinforce the Government's emphasis on T&E leadership, planning, and execution with the contractors. Incentives beyond the required cost incentive may be monetary, nonmonetary, positive, or negative, but regardless of their structure, the goal is to encourage high-quality performance to achieve program goals. The PM must prepare an incentive fee determination plan to document the process that will be used to determine the incentive fee.

Incentives for motivating excellence in the T&E portion of a program may be based on schedule or performance, but an incentive contract cannot provide for other incentives without also providing a cost incentive or constraint (Subpart 16.402 of Reference (e)). Some of the T&E criteria are inherently mixed with other criteria, especially technical criteria, including risk management, timely data delivery, and access. Incentives should be tied to specific test events, such as demonstrating a specific capability in the system integration laboratory or testing a critical capability with a full-scale test article.

The incentives applicable to T&E have tended to be subjective, award-fee measures, which will be discussed in section 2.3.2.2. When structuring incentives for the entire program, the RFP team must keep in mind the Federal Government's policy to not incentivize minimum performance requirements and to avoid the potential dangers of incentive dilution, incentive contradiction, and unintended adverse consequences. For example, small increases in incentivized performance may have undesirable impacts on other program elements that are important but not incentivized. Or, a contractor's desire to earn schedule incentives could detract from sound engineering decisions. Schedule-based incentives may diminish the intended benefits of the test activity (e.g., the data collected cannot support integrated testing

strategy).

The incentives should take into account non-test items that could affect the length or productivity of the test program. For example, if a radar system is not ready for testing at the same time as the rest of the weapon system, the test program could be delayed or lose efficiency because the program has to repeat test events when the radar is installed. In that case, an incentive placed on delivery of critical subsystems to the test program would have a greater effect on test program efficiency than any incentive applied directly to the test program itself. However, this also may be accomplished through a modification in delivery schedules of the critical subsystems. In general, focus incentives on demonstrating that key programmatic and technical risks are resolved as soon as possible, and avoid any incentives that may drive the contractor to delay testing inappropriately.

The contractor can be incentivized to use preexisting Government ranges, facilities, and instrumentation that is sized, operated, and maintained to provide T&E information to Government T&E users. If the contractor develops internal T&E capabilities that duplicate existing Government facilities, the acquisition program may incur additional costs that could be avoided. Incentives can also be tied to the contractor using preexisting Government test ranges/facilities to include instrumentation. As a national asset, the MRTFB is sized, operated, and maintained to provide T&E information to DoD Component T&E users in support of DoD research, development, T&E, and acquisition processes. If the contractor develops an internal test capability for a system that already exists within the MRTFB, a cost penalty will be incurred.

- **Use of Government Test Facilities.** The Lead for T&E will take full advantage of existing investments in DoD ranges, facilities, and other resources, including the use of embedded instrumentation. Test teams should plan to use MRTFB facilities and capabilities first, followed by Service test facilities and capabilities, followed by non-DoD Government facilities
- **Use of Nongovernment Facilities.** Contractor facilities should be used only when Government facilities are not available, cannot be modified, are too expensive, or are impractical to use. If the strategy for T&E calls for testing at nongovernment facilities, the PM must conduct a CBA, include these facility requirements in the RFP, and document the final choice in the TEMP.

2.3.2.2 Award Fees

The application of award fee incentives is generally associated with cost-reimbursement contracts but may be used in either fixed-price or cost-reimbursement contracts. An award fee provision may be used when the Government wishes to motivate a contractor and other incentives cannot be used because contractor performance cannot be measured objectively (See Subpart 16.404 and 16.405-2 of Reference (e)). The award fee approach is suitable for use when it is neither feasible nor effective to devise predetermined objective incentive targets applicable to cost, technical performance, or schedule.

Although award fee incentives can produce positive effects, the effort required for periodic evaluations in accordance with the award fee plan (e.g., continuous monitoring, midterm analyses, final analyses, and periodic reports) must also be considered, particularly for smaller program teams. Consider the investment in resources versus incentive gain before deciding to use an award fee approach. Award fee criteria need specific data and performance examples to make an award fee determination. As subjective measures are used, the contractor must clearly understand expectations and be promptly advised of any problems or issues that may affect the award determination.

The contractor earns the incentive awards through a subjective evaluation process conducted by an Award Fee Review Board described in an award fee plan. For example, if the program requires the contractor to develop a test bed, the award fee incentive could be related to the test bed development, test, and acceptance according to the schedule, cost, and test bed performance requirements. This incentive approach allows the Government to reward exceptional contractor performance while considering the conditions under which it was achieved, normally in such areas as quality, timeliness, technical progress, technical ingenuity, and cost-effective management. The Government should avoid making early completion of technical reviews an award fee criterion because such an incentive could discourage the conduct of sufficiently thorough event-based reviews and therefore be counterproductive. Appendix C lists sample T&E award fee criteria. Table 2-1 lists 14 items to consider when developing

T&E award fee criteria.

1. Contractor has executed the T&E strategy and approach in accordance with the TES/TEMP/test plan, and integrates management plans/tools.
2. Contractor has implemented and demonstrated a disciplined T&E management process to capture test entrance, exit, and success criteria with clearly defined metrics.
3. Contractor has presented a well-thought-out trade study and/or limited development test (LDT) plans for the program and provides evidence of systematically evaluating all aspects of the system. The trade studies utilize common sets of critical trade parameters that are focused on the critical performance, schedule, and cost requirements of the program. Trade studies are documented and archived to establish an audit trail for the principal technical decisions on the program. The contractor conducts LDTs to test and evaluate specific critical aspects of system performance.
4. Contractor has demonstrated that T&E data ownership, control, access, sharing, completeness and accuracy, and delivery support the T&E strategy and approach.
5. Contractor continually demonstrates timely and efficient preparation of T&E plans and reports as the system is progressively described to its lowest level of detail.
6. Contractor uses M&S to minimize the number of tests, which results in overall lower costs. M&S must undergo verification, validation, and accreditation (VV&A).
7. Contractor has implemented a process to track test failures, analyze and establish corrective actions, and provide feedback into plans and procedures to improve T&E efficiency. The contractor has a deficiency reporting (DR) system that is compatible with and feeds into the Government-run DR system.
8. Contractor has established and implemented an event-based T&E process through the use of technical performance measures (TPMs) to include reviewing events with entry, exit, and success criteria.
9. Contractor demonstrates effective risk management, actively involving the Government to assess major risk areas, and establishes specific risk mitigation plans that are integrated into program plans.
10. Contractor flows T&E processes and plans to the subcontractors and actively involves the subcontractor team in T&E baseline management, configuration management, requirements management, and risk management activities.
11. Contractor has a disciplined action item tracking system that documents system and subsystem, if applicable, performance problems/issues that require program management attention.
12. Contractor has an exceptional record in meeting milestones and due dates and effectively uses T&E metrics to manage the T&E program.
13. Contractor has implemented Department-level policy and guidance, including JCIDS planning processes, scientifically based test design (i.e., design of experiments (DOE), HSI testing, and testing in a joint environment.
14. Contractor has implemented opportunities for integrating contractor testing, DT, OT, interoperability, security, IA, and DIACAP certification with the goal of developing cost-effective test programs with shorter schedules.

Figure 2-1 T&E Award Fee Considerations

2.3.2.3 Information on Incentives

Part 16 of Reference (e), the DFARS (Reference (d), Service FAR supplements, and individual incentive and award fee guides (e.g., Air Force Award Fee Guide (Reference (i)), Air Force Guide Award Term/Incentive Options (Reference (t)), Army Award Fee Guide (Reference (j)), and the Navy-Marine Corps Award Fee Guide (Reference (k))) provide additional information, address ways to structure incentive and award fee plans, and provide examples. Other applicable references and guides include a memorandum from the Office of the Deputy Under Secretary of Defense for Acquisition, Technology, and Logistics (OUSD(AT&L)) Memorandum on Award Fee Contracts (Reference (u)), DAU's Acquisition Community Connection (Reference (v)), and the Under Secretary of Defense for Acquisition and Technology Memorandum, —Incentive Strategies for Defense AcquisitionsII (Reference (w)), which provide details on different incentive approaches.

2.4 Market Research

FAR Part 10 (Reference (e)) requires the Government's acquisition strategy to include the results of market research. FAR Part 10 implements the requirements in sections 253a(a)(1) and 264b of title 41 and section 2377 of title 10 of Reference (h). Market research is one method to establish the availability of products and the suitability of commercial products (e.g., COTS products) to meet the potential Government system performance needs. Such research supports the acquisition planning and decision process by supplying technical and business information about commercial and DoD technology, products, and industrial capabilities.

Market research is used to obtain current information on companies' maturity model level rating and their application of rated processes within specific domains of their company. The maturity model rating is not the sole determinant of process maturity. The corporate commitment to continuous process improvement (CPI) with documented plans and maturity milestones is also an important element. Frequently during the pre-solicitation and RFP preparation phase of a program, the Government team seeks business, T&E, and acquisition planning information via a request for information (RFI). The Government usually sends these requests via the Government-wide point of entry found at the Federal Business Opportunities (FedBizOpps) Website (Reference (x)). The RFIs solicit data from interested industry sources, but such responses might be limited because the request for data and information is unfunded. The RFI can be used to supplement market research and to secure specific types of T&E data, including the extent of the companies T&E domain experience and details on their T&E best practices. RFIs can provide valuable insight on how potential offerors have integrated their technical, T&E, and management processes to effectively manage prior programs. Each year, the MRTFB activities are required to submit a notice, via FedBizOpps, that describes the nature of the anticipated commercial work and invites private sector responses proposing capability to perform these T&E services.

2.5 Industry Days

Before release of a formal RFP, the Government may hold Industry Days to inform industry about the technical requirements and acquisition and T&E strategies, and to solicit industry input for the pending program. During this time, communications are unencumbered by the formality and limitations associated with the formal RFP/source selection process. T&E personnel need to avail themselves of this opportunity for free and open communications. They should emphasize the importance of the significant aspects of T&E requirements (such as M&S, hardware-software and system component integration T&E, use of test beds, prototypes, incremental T&E and fielding, having interoperability architectures, and identification of specific ranges) to resolve T&E complexities and mitigate actual or anticipated program risks. The Government should initiate discussions of the following seven T&E topics during Industry Days discussions.

1. **T&E Strategy and Approach.** Continually emphasize the importance of the overall

technical approach and associated T&E strategy and approach. The Government-prepared TES/TEMP should be made available to industry, in accordance with DoD Component direction and guidance.

2. **M&S Users.** Discuss M&S testing (especially the VV&A process and proprietary rights) and any trade studies, LDTs, and analyses that have been conducted during the requirements generation process. Although solution alternatives are studied during this phase of the program, the emphasis should remain on the resulting performance requirements and not on the specifics of the alternatives. Government trade studies, LDTs, and analyses should be made available to industry as appropriate.
3. **Potential T&E Solutions.** Although it is necessary to investigate potential T&E solutions that are responsive to the requirements, the Government team should avoid becoming fixated with the solutions. The user sometimes becomes enamored with what he or she likes, the acquisition team focuses on the solution that works, and industry has a solution it wants to sell. Instead, the team should focus on establishing the cost-effective T&E processes and events that generate appropriate technical and operational data to allow decision makers to make informed decisions.
4. **Supporting Management Processes.** T&E members need to emphasize that potential offerors must have T&E management processes to implement during program execution. The Government team should have a clear understanding of system/subsystem requirements, encourage the offerors to discuss their T&E approach, and encourage the potential offerors to document their approach.
5. **T&E Approach.** T&E members need to address the T&E approach and how it was established. This is an excellent opportunity to reinforce the importance of the T&E processes and schedule for the program and for the Government to describe its T&E approach to the program.
6. **Corporate Proprietary Information.** Keep in mind that prospective offerors exercise extreme caution during open sessions for fear of compromising a competitive advantage or revealing a perceived weakness. During one-on-one sessions, the discussions are more open, but be careful to provide all offerors with equivalent information about the Government's needs without divulging potential solutions considered by other offerors.
7. **Areas of Mutual Interest.** Identify areas of interest and encourage prospective offerors to provide data, insights, and suggestions that facilitate the transition into EMD with sound performance requirements and a well-structured T&E approach. The agenda and topics should not be left solely to the discretion of the offerors.

For additional information on exchanges with industry before receipt of proposals, see the other eight techniques discussed in Subpart 15.201(c) of Reference (e) .

2.6 Division of Responsibilities/Authority

Additional Government team considerations for working with industry are the division of responsibilities between the Government and the contractor, the definition of contractor testing and Government testing, and the level of authority granted to each to execute the test program. The contract should be clear on what the contractor is expected to deliver in terms of articles, data, performance, or services. However, T&E programs usually involve a shared responsibility in the planning, execution, and reporting of T&E. If this shared responsibility and authority are not clearly addressed during contract formulation and award, then any misunderstandings will cause problems during program execution. The problems can range from minor discussions over who can approve test plans, to major disconnects, such as missing equipment, that can bring the program to a halt.

The strategy for planning and executing the test program needs to be agreed upon prior to release of the solicitation. One strategy consideration concerns overall control of the test program:

Will the contractor run everything with the Government testers in a support role at the contractor's facility? Will it be shared? Or, will the Government testers at Government ranges/facilities be in control with the contractors in a supporting role? Remember, for OT, the contractor can be involved only to the extent that it will be involved once the system is fielded. Responsibilities related to planning detailed tests and controlling execution of test events also need to be considered. In addition, responsibilities for conducting test-related safety analyses and mitigating test risks must be considered during SOW and RFP generation. Some of the answers will be driven by the choice of test ranges and facilities to be used (e.g., contractor or Government), but such issues still must be explicitly considered.

Another factor in addressing the level of responsibility of the contractor versus the Government is the overall level of system performance responsibility assigned to the contractor through the contract.

Will the contractor have total system performance responsibility and be expected to handle all of the integration issues for the total system and deliver end-system performance? Or will the contractor be responsible for only one element of the total system, with the Government or another contractor becoming the system integrator and accepting the risks associated with delivering end-system performance? The choice will affect the way in which the Government works with the contractor and the division of responsibilities and authority between the Government and the contractor.

2.7 Draft Request for Proposals

- **Part I – Schedule**
 - A. Solicitation/contract form
 - B. Supplies or services and process/costs
 - C. Description/specifications/statement of work
 - D. Packaging and marking
 - E. Inspection and acceptance
 - F. Deliveries of performance
 - G. Contract administration data
 - H. Special contract requirements
- **Part II – Contract Clauses**
 - A. Contract clauses
- **Part III – List of Documents, Exhibits, and Other Attachments**
 - A. List of Attachments
- **Part IV – Representations and Instructions**
 - A. Representations, certifications, and other statements of offerors or respondents
 - B. Instructions, conditions, and notices to offerors or respondents
 - C. Evaluation factors for award

FIGURE 2-2 Uniform Contract Format

The RFP is a solicitation used in negotiated acquisition to communicate Government requirements to the prospective offerors and to solicit proposals. Subpart 15.204 of Reference (e) specifies that the format

and content of RFPs and contracts be prepared in accordance with specific guidelines called the Uniform Contract Format (see Figure 2-2).

The RFP typically includes two kinds of documentation: program documents and RFP documents. Figure 2-3 depicts the flow from program documentation to populate typical RFP sections to a typical proposal.

- **Program Documents.** The AS, program IMP or top-level program roadmap, incentive plan or award fee plan, Government SEP, TEMP, and the preliminary SPS are the program's important documents that are typically attached or referenced in the RFP and may be included in an "Offeror's Library." These documents describe the Government's management, technical, and T&E approach to the system acquisition along with the required system performance requirements and other important program planning elements.
- **RFP Documents.** A typical RFP includes a model contract with any special contract requirements, contract line item numbers (CLINs), SOO, SOW, CDRL, WBS, evaluation criteria (Section M), and instructions to offerors (Section L). The RFP (in concert with the program documents) defines the program to be proposed.

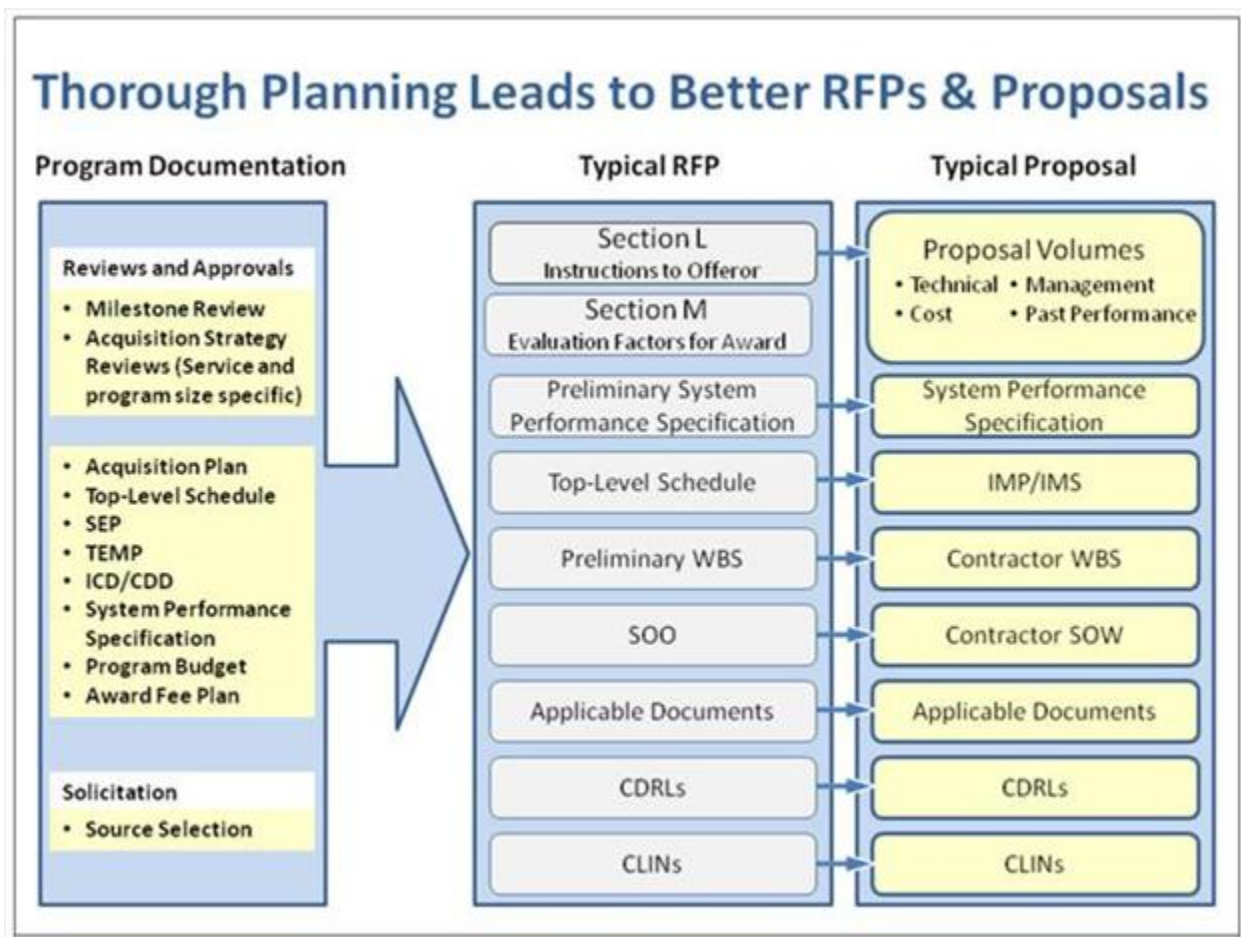


FIGURE 2-3 Relationship of Program Planning to a Typical RFP and Proposal

Early preparation of the Government TEMP is an important step to foster synergy among RFP sections. An integrated approach, developed specifically for each program, will result in a high degree of synergism and integration of all RFP and proposal elements. For instance, the SOW, PWS, IMP, IMS, SEP, TEMP, model contract, and the critical processes are all interrelated. The following subsections discuss the core RFP documents that contain substantive T&E material and the applicable companion proposal documents. Sections C, L, and M are the primary parts of the RFP influenced by the T&E approach to the

program.

The RFP captures and amplifies the acquisition, technical, T&E, and support program strategy. There is a natural flow of information from the program strategy, to RFP, to proposal, and the resulting contract. Each program must develop the RFP according to the program strategy. Some items are required for source selection purposes only, such as the proposal volumes and/or past performance information. Some items will become parts of the contract, such as the IMP, SOW, and SPS.

2.7.1 Statement of Objectives (SOO)

The SOO is that portion of a contract that may establish a broad description of the Government's required performance objectives. The SOO delineates the program objectives and the overall program approach. The SOO, along with the preliminary SPS (covering the technical performance requirements), provides offerors with guidance for proposing a program to meet the user's needs. The SOO is an RFP document that does not become part of the ensuing contract.

A PWS may be prepared by the Government or result from a SOO prepared by the Government in which the offeror proposes the PWS in accordance with Subpart 37.602 of Reference (e). The SOO is replaced by the PWS; the PWS becomes part of the contract.

The Government desires an efficient and integrated experimental design and analysis (i.e., DOE) approach linking the contractor's design process, proposed M&S efforts, hardware-in-the-loop (HWIL) utilization, and any planned ground or flight test associated with this effort. Selected test points should be tested in the HWIL as part of formal qualification testing. The Government expects efficient and effective tests with statistically significant results over a broad range of operational conditions. Test plans should cite the statistical risks implied by the proposed test programs. Specifically, tests should be designed to obtain data that: (1) support design space trades as part of the development process, (2) assess performance, and (3) predict performance over the system's operational space. The Government expects that the contractor will implement this experimental design and analysis approach to take advantage of the greater understanding of product physics, identify sensitivities to the parameters of interest, and utilize relevant statistics to reduce schedule and costs while lowering overall program risk.

Section C of the RFP contains the detailed description of the products to be delivered or the work to be performed under the contract and the preliminary SPS. The preliminary SPS is addressed in section 3.13.1 of this guide. Other contract requirements documents may be included such as sample IMP event descriptions, CDRL, Contract Security Classification Specification (DD Form 254), and pricing matrices. Table 2-2 contains text for inclusion in a SOO that emphasizes the main T&E themes of this guide. Specific program requirements and the program strategy are used to modify this example.

TABLE 2-1 T&E Content for the Statement of Objectives

Statement of Objectives

The T&E approach will capitalize on best practices from industry domain experience and will implement DoD T&E policies. The program shall:

1. Document the T&E approach in an integrated Government TEMP that covers the life of the program. Reference (a) defines the life of the program.
2. Utilize contractor T&E best practices and processes to reduce cost. Includes agile and mature technical and management program processes based on company processes that undergo continuous improvement throughout the program's life cycle. Policies and processes shall flow down to the lowest level of the contractor (subcontractors, teammates, or vendors) team.
3. Implement event-based program milestones (e.g., critical design review (CDR)) and integrated schedules (e.g., integrated master T&E schedule). Implement event-based T&E events and reviews involving Government and industry SMEs.

4. Use contractor configuration management processes to control the configuration of the T&E data in a common T&E database. Provide real-time access to the T&E baseline data for program participants.
5. Enhance opportunities for incorporation of improved capabilities and advanced technology using the modular open systems approach (MOSA). Encourage use of commercial products/processes/standards.
6. Include Government participation on integrated product teams (IPTs)* to gain insight into program progress.
7. Ensure that the requirement for a RPP is documented.
8. Implement a comprehensive risk management process that also includes risks associated with the program's critical path, to systematically identify and eliminate/mitigate cost, schedule, technical, and performance risks.
9. Institute a requirements management process coupled with a T&E baseline management strategy that supports the TD and EMD phases, as applicable, and an orderly transition to the production, deployment, operation, and support acquisition phases.
10. Ensure that the contractor has an efficient and integrated experimental design and analysis approach (i.e., DOE) that supports program execution.
11. Require contractor participation as appropriate in Government reviews in which T&E matters are discussed (e.g., certification of test readiness, technical reviews, and data reviews).

* T&E SMEs may participate in different teaming arrangements, including T&E IPTs, T&E WIPTs, and program-specific teams such as contractor/combined test teams (CTTs), a combined T&E task force (CTF), or ITTs. The title by itself is not important. The key to a team structure is the charter, which lists the roles, responsibilities, products, and stakeholder membership.

2.7.2 SOW/PWS

The SOW/PWS is that portion of a contract that establishes and defines all non-specification requirements for a contractor's efforts, either directly or with the use of specific cited documents. The offeror may provide a SOW to be included in the negotiated contract. The Government may provide a SOW/PWS as part of the RFP instead of a SOO, in which case the offerors will tailor the SOW/PWS in their proposals depending on their specific solutions to the requirement. The SOW/PWS should accomplish the following:

- Describe the T&E events and activities to be accomplished that reflect the T&E approach to the program as described in the TEMP.
- Reflect use of T&E processes across the program that are critical for program success. Processes include reliability growth planning, technology maturity assessment, management of performance deviations and waivers, performance baseline control, risk management, configuration, experimental design and analysis approach (i.e., DOE), integrated testing, and T&E data management, including Government access and sharing of contractor data, tests, and results.
- Plan for and support T&E events and event-based reviews as defined in the TEMP or the program plan.
- Address the T&E baseline management process, associated T&E data, and Government-approved stakeholder access to all T&E data, including M&S data.
- Provide for TEMP updates and CPI consistent with corporate improvements, technical changes, and program needs.

- If a Government SOO has been developed, include a cross-reference matrix tracking the Government SOO requirements to the proposed SOW. The SOW should be structured for the proposed system solution and not restricted by the structure of the Government's SOO.
- Include the necessary contract language to ensure that an RPP is delivered.
- Address the following items, as necessary, relative to the T&E strategy and approach: contractor test plan, detailed test plans and reports, T&E support for Government-conducted tests, test instrumentation, TRRs, failure review boards, DR, and T&E WIPT support.

The contractor SOW/PWS addresses the requirements in the SOO or RFP SOW, other sections of the RFP, and derived requirements based on the offeror's approach. The SOW should include those T&E tasks and activities that the contractor is required to execute during the contract. The T&E approach relies heavily on contractor's processes and practices, and the SOW should address the application of these processes and practices during DT&E, OT&E, and sustainment as applicable to the program. It is generally not the intent to put the specifics of the contractor's individual processes and practices on contract, but the SOW should recognize the application of key T&E processes and practices on the program. The SOW should address the Government's requirement and not a contractor's solution. When a contractor proposes a detailed SOW, it must still be stated in terms that describe the Government's requirements. Table 2-3 provides a sample content for the SOW/PWS.

TABLE 2-3 T&E Content for the SOW/PWS

Sample Instruction for Proposing T&E Activities in a SOW/PWS

The offeror shall provide a SOW/PWS to be included in the negotiated contract. The SOW/PWS shall:

1. Describe the T&E work/tasks/activities to be accomplished on the program that reflect the T&E approach to the program as described in the TES/TEMP.
2. Identify the role of M&S to be used in support of the T&E process and the documented VV&A of any M&S to be used.
3. Reflect use of T&E processes across the program that are critical for program success (e.g., requirements management, performance baseline control, risk management, configuration and data management, and interface management).
4. Provide for TES/TEMP updates and CPI consistent with corporate improvements and program needs.
5. Address the T&E baseline management process, associated data, and stakeholder access to all T&E data, especially the handling and accountability of expected performance deviations or waivers.
6. Provide for TES/TEMP updates and continuous process improvement consistent with corporate improvements and program needs.
7. Include a cross-reference matrix showing the tracking of Government SOO or SOW requirements in the proposed SOW. The SOW should be structured for the proposed system solution and not restricted by the structure of the Government's SOO or SOW.
8. Provide the proposed RPP format and content.
9. Describe the closed-loop Failure Reporting and Corrective Action System (FRACAS) strategy in terms of methodology, processes, and database(s) used to support the contract and throughout the system life cycle. The proposed contractor DR database must be compatible with (i.e., feed into) the Government's DR database.

10. Provide personnel and documentation (drawings, etc.) support to Service OTA during operational assessments and test events

2.7.3 RFP T&E Insertion

The following information will assist the T&E Lead when working with the PM and the IPT in the development of the RFP and helps ensure the program RFP from a DT&E perspective tracks with program acquisition documents along with requirements prior to release to industry.

- **T&E Management.** The T&E Lead should ensure that the RFP describes overall T&E management structure, responsibilities, experience of T&E staff, and application of T&E best practices.
- **T&E Data.** The T&E Lead should ensure that the RFP describes the contractor's approach to technical data, to include management, control, access, and delivery of T&E data.
- **M&S.** Ensure (if applicable to program) that the RFP describes allocation of M&S responsibilities, expectations, and M&S tools.
- **RAM.** Ensure that the RFP describes the approach and procedures to perform RAM.
- **IA.** Ensure (if applicable to program) that the RFP describes the contractor's IA responsibilities.
- **T&E Planning and Resources.** Ensure that the RFP describes the change management process for updates to test plans and test assets. Describe Government and contractor test resources required. Ensure that a business case analysis was conducted and documented within the TEMP for use of contractor-unique resources vice Government-owned facilities.
- **Software.** Ensure (if applicable to program) that the RFP describes the responsibilities of the contractor and Government during test execution. Ensure that the process for contractor DR and resolution is described.

The following documents will assist in the development of the RFP: Draft RFP (with CDRLs), SSP, Program AS document/Acquisition Plan, TEMP, and any requirement documents (ICD, CDD, or CPD). The T&E Lead should see Subpart 15.204-2 and Part 16 of Reference (e) for additional clarification and/or guidance.

2.8 T&E Focus Areas

There are 10 T&E interest areas the PM team should address in the planning stage, prior to issuing a solicitation for a contract: integrated testing, shared test data access, system of systems (SoS), test assets, ranges and resources, reliability, modeling and simulation (M&S), government furnished equipment (GFE), safety, and software.

2.8.1 Integrated Testing

Integrated testing is defined in Reference (y) as —...the collaborative planning and collaborative execution of test phases and events to provide shared data in support of independent analysis, evaluation and reporting by all stakeholders particularly the developmental (both contractor and government) and operational test and evaluation communities.¶ The PM and Lead for T&E need to consider the availability of in-house or DoD Component T&E resources, as well as contractor use, relationship, and responsibilities for DT&E, OT&E, interoperability, IA, security, and other equivalent types of T&E activities, to include DIACAP C&A. The PM and Lead for T&E need to consider such questions as:

- Who will be in charge of the testing – Government or contractor?
- Will Government personnel "work" for the contractor (i.e., Government-furnished personnel)?
- Who is accountable for test conduct and reporting?
- What is the Government's T&E oversight role and process?
- Will the Government witness the testing at the contractor's facility?
- Will the Government receive all pertinent contractor raw test data?

The contractor and Government's T&E roles and responsibilities must be clearly, accurately, and completely identified. Subpart 9.5 of Reference (e) provides the responsibilities, general rules, and procedures for identifying, evaluating, and resolving organizational conflicts of interest. Specific statutory and regulatory guidance exists with respect to contractor involvement in OT&E and LFT&E. DoD Components have specific guidance relative to contractor involvement in their respective acquisition programs.

System contractors may be beneficial in providing logistic support, test failure analyses, and software and instrumentation support that could increase the value of unprocessed OT&E data. Clear explanations of how system contractor support will be used and the mitigation of possible adverse effects must be described in the TEMP and OT&E plans to ensure no violation of the prohibitions in section 2399 of Reference (h).

2.8.2 Shared Test Data Access

Most systems will utilize technology and subsystems developed for other programs or in prior efforts. To take advantage of this prior data, and data generated during contractor development, the issue of data access needs to be addressed. Resolving the issue may touch on data rights issues, which can be a source of contention. The data access issue does not automatically mean buying all the data packages from the contractor. Instead, it means ensuring that the Government will have access to the needed data in the future. Perhaps the best outcome that can be negotiated in the contract is the fee or rate to be paid for whatever data is needed in the future.

Negotiating the data access issue early, during the competitive portion of the contracting process, will minimize the cost for the data requested later during the execution of the contract. Note that data access could be considered from both perspectives; the contractor may want access to data the Government has or is aware of concerning technologies that the contractor needs. Typically, if contractor test data is to be used as part of the independent system evaluation, the Government will require that the test be witnessed by the tester, evaluator, or PM. Data access also means that contractors are authorized to use the data, for example, information technology 1 or 2 or 3 access permissions, and that the contractors possess the required security clearance.

Testing requirements in the RFP should include procedures for ensuring the pedigree of the data. This should include that government will have review and approval of contractor test plans prior to execution of test event, government witness of test event, and government review and approval of final test report/analysis.

2.8.3 Integrated Testing

Expected product/system interoperability should be clearly identified in the SOO and CONOPs and will drive the T&E strategy, needed resources, and schedule. For example, does the product/system being developed stand alone, or is it part of an SoS? What is the relationship between this system and the other systems? Are the boundaries/interfaces between systems well defined?

2.8.4 Modeling and Simulation

A significant costing topic is the number of test assets required for conducting the necessary test cycles during DT, OT, LFT&E, IA, security, interoperability, DIACAP C&A, and contractor testing. The number of test assets required for conducting DT&E, OT&E, IOT&E, and LFT&E is typically recommended by the T&E WIPT with Director of Operational Test and Evaluation (DOT&E) concurrence and documented in the TEMP that is approved by the Office of the Secretary of Defense. These determinations should

include identification of spares. Consideration of this topic must be in conjunction with M&S expectations, any statutory and/or regulatory requirements, and required sample size, as determined by experimental design and analysis (such as DOE) or equivalent analysis, necessary to support the stated performance confidence levels.

2.8.5 System of Systems

The identification of test ranges, facilities, and other needed resources (such as personnel, equipment, and test organizations for DT&E, OT&E, and LFT&E) should not be delayed until the final stages of TEMP approval. The test ranges, range resources, equipment, and personnel should be identified to the extent possible in the T&E strategy development process. Especially, it must be clear which DoD assets the Government requires the contractor to use or the contractor should specifically identify and justify use of its own test resources. Government and contractor test facilities should be compared to ensure that there is no duplication and that the most appropriate facility to conduct the T&E is identified. If Government test facilities are required, ensure that the contract with the DoD contract sponsor provides the use of test support from the Government T&E facility or capability at the established rate in accordance with chapter 12 in DoDD 7000.14-R, volume 11A. Otherwise, defense contractors will be charged as commercial customers.

2.8.6 Government-Furnished Equipment

The identification of and control for GFE for T&E must be identified early because both issues will affect contract funding and scheduling. In areas like support equipment, not identifying GFE can be a showstopper if an incorrect assumption is made about equipment availability. Similarly, the government does not want to pay for development of contractor-unique support equipment if the design can use existing support equipment.

2.8.7 Ranges and Resources

The identification of test ranges, facilities, and other needed resources (such as personnel, equipment, and OTA for DT&E, OT&E, and LFT&E) should not be delayed until the final stages of TEMP approval. The test ranges, range resources, equipment, and personnel should be identified to the extent possible in the T&E strategy development process. Especially, it must be clear which DoD assets the government requires the contractor to use, or the contractor should specifically identify and justify use of its own test resources. Government and contractor test facilities should be compared to ensure there is no duplication and that the most appropriate facility to conduct the test and evaluation is identified. If government test facilities are required, ensure that the contract with the DoD contract sponsor provides the use of test support from the MRTFB facility at the government-established rate in accordance with DODD 7000.14-R, volume 11A, chapter 12. Otherwise, defense contractors will be charged as commercial customers.

2.8.8 Safety

The type of product/system will drive the personal and system safety issues. Because the T&E program will involve real people using real systems, the strategy for ensuring the safe conduct of the test program must be captured. One issue of particular importance is where the final safety decision rests—with the government (such as the program office or range safety officer) or contractor. Safety topics include accountability in case of an accident and weapon release authority.

2.8.9 Test Assets

A significant costing topic is the number of test assets required for conducting the necessary test cycles during DT, OT, LFT&E, and contractor testing. The number of test assets required for conducting DT&E, IOT&E and LFT&E is typically recommended by the T&E WIPT, with DOT&E concurrence, and documented in the Office of the Secretary of Defense (OSD)-approved TEMP. These determinations should include identification of spares. Consideration of this topic must be in conjunction with M&S expectations, any statutory and/or regulatory requirements, and required sample size necessary to support the stated performance confidence levels.

2.8.10 Software

Software is a rapidly evolving, emerging technology that can now be found in major components and critical subsystems of most DoD materiel solutions. Software allows creation of products that fundamentally differ from hardware components. The following identifies differences between hardware and software:

- Software has no physical characteristics limiting size or prescribing natural, structural units with boundaries and proximal interfaces.
- Software structural units are statements, objects, and programs for which the interfaces are intangible and range widely in diversity, complexity, and dynamic behavior.
- Software functionality is virtually boundless, unconstrained by material properties and associated manufacturing technologies.
- Software units are captured abstractions of functions allocated to design, easily changeable, and therefore challenging to manage and maintain.
- Unlike hardware that typically degrades gradually before failing, software typically fails abruptly and with greater consequence to delivery of expected system performance.
- Software almost always delivers function through code execution in a non-deterministic domain space and therefore cannot be exhaustively tested and will always contain faults. Software testing mitigates the risk of performance failures by exposing code faults and is therefore fundamentally a risk-reduction activity.
- Software component implementations have the following distinct properties that make engineering and programmatic management inherently difficult throughout the system life cycle:
 - **Complexity:** Difficulty in describing software structure and predicting behavior.
 - **Changeability:** Having no physical properties; software can be easily changed throughout development and fielded service. Software change is inevitable, enabling responsiveness to changing threats, capability needs, technology advances, design improvements and corrections, and management resource budgets.
 - **Invisibility:** Without physical form, software architectural representations fall short of complete representation of complexity, size, and critical characteristics.
 - **Conformity:** Software change is the means by which systems maintain conformance to changing service environments, management and resource constraints, and interfaces with hardware and other software systems. Conformity is achieved through near continuous verification.
- System designs that incorporate software components require consideration of these unique differences and their implications for software T&E. The requirement to demonstrate comprehensive software T&E capacity should be integrated into solicitations. Responses to the software T&E requirement should be evaluated in proposals, and past performance artifacts should be examined to address the following critical areas:
 - Allocation of sufficient financial and schedule budgets, material, and domain expertise across the WBS and IMP/IMS to properly incorporate software T&E with software architecture and design development, software production, subsystem and system integration, and product sustainment.
 - A comprehensive software T&E strategy that specifically includes evaluation of high-risk technologies in system designs and complexity in the system software architecture. This strategy should identify and describe:
 - Metrics and evaluation data for resource management, software system requirements, and product quality, including reliability and product reliability growth
 - Types and methods of software testing to achieve comprehensive evaluation
 - Software T&E directly supportive of the program risk management enterprise, and responsive to risk-reduction strategies and risk-mitigation activities

- Data management, analysis, and evaluation methods and tools
- Models and simulations contributing to software T&E, including accreditation status and planning
- Software development, integration and test, and software-hardware integration labs and facilities.
- A defined software T&E process consistent with and complementing software unit, subsystem, and system development, maintenance, and systems engineering processes, committed to continuous process improvement and aligned to support project phases and reviews, including an organizational and information flow hierarchy.
- Software test planning and test design initiated in the early stages of functional baseline definition and iteratively refined with T&E execution throughout allocated baseline development, product baseline component construction and integration, system qualification, and in-service product sustainment.
- Thorough T&E of design reuse (COTS, GOTS) of software code, databases, and hardware, and associated test procedures or test data. Reuse planning should include a defined process for component assessment and selection, and test and evaluation of component integration and functionality with newly constructed system elements.

3. Solicitation

The contents of this section will focus on and consider the most important contractual T&E items during transition from the pre-solicitation phase to the actual drafting of the RFP. In contracting, the term —solicitation means to go out to prospective bidders and request their response to an RFP. The solicitation builds upon the SOO and the SOW. All previous identification, development, and refinement of T&E requirements now have to be captured clearly, completely, and accurately in the appropriate sections of the RFP.

3.1 Section B of the RFP: Supplies or Services and Process/Costs

Section B of the RFP contains a brief description of the supplies or services; for example, item number, national stock number/part number if applicable, nouns, nomenclature, and quantities, and includes incidental deliverables such as manuals and reports. All CDRLs should be reviewed for inclusion of T&E execution support (i.e., data rights, test data, test plans, source code drop, prototype quantity, delivery times/location).

3.2 Section C of the RFP: Description/SOW

Section C of the RFP contains the detailed description of the products to be delivered or the work to be performed under the contract. This section typically includes the Government's SOO (or SOW) and preliminary SPS. The preliminary SPS was addressed in section 3.13.1. Other documents may be included, such as sample IMP event descriptions, CDRL, Contract Security Classification Specification (DD Form 254), and pricing matrices. A major discussion item is the inclusion of the implementation and execution of reliability activities fully integrating systems engineering, DT, OT, IA, security, interoperability, and DIACAP C&A. Appendix F provides a checklist to guide your discussions and decisions relative to RAM planning, accountability, and reporting for the program. Questions for consideration: *Are all requirements clearly defined and stated in performance-based terms? Are performance-based characteristics directly tied to program objectives?*

3.2.1 Statement of Objectives (SOO)

The items in Table 2-2 should be addressed in a SOO to emphasize the main T&E themes of this guide. Specific program requirements and the program T&E approach will help tailor these items.

3.2.2 SOW/PWS

See section 2.7.2 of this guide for SOW/PWS content. The following five elements need to be considered during the proposal development:

- SOWs are often too detailed and inadvertently include inappropriate items for a contract. For example, technical day-to-day procedures and/or instructions are captured in such detail that as they mature during the program, they cannot be implemented without a contract change. The goal is to secure a commitment to implementing the process and not controlling the detailed procedures. The TEMP should capture how the T&E processes operate for the program. Therefore, the
- SOW should refer to the TEMP as a commitment to implementing the processes defined for the program.
- SOW tasks should be reflected in the IMP/IMS, especially the technical baseline management, technical design, verification, and validation tasks and their associated system-level event-based technical reviews.
- The SOW should not identify individuals or specific IPTs that accomplish the tasks and should avoid including start dates or completion dates. These dates, and sometimes the IPTs that will accomplish the tasks, are identified in the IMS.
- Conducting event-based technical and test reviews should be appropriate and consistent with the program technical and support strategy included in the offeror's proposal.
- All the important T&E management processes and tasks should be included, such as decision analysis, T&E planning, assessment, test plans, reports, data requirements, and risk and configuration management. The information in the Appendixes can be a useful aid during the SOW evaluation to ensure completeness.

3.2.3 Test and Evaluation Master Plan (TEMP)

The TEMP is used to evaluate the completeness of program planning and application of T&E best practices. The following is a list of five considerations when evaluating the offeror's proposed integration of its T&E solution and program technical approach with the management approach, which should be included in a source selection evaluation guide or other appropriate document:

- The proposed T&E solution incorporates best practices and processes that are mature, stable, and will be applied to the program. Any tailoring or modifications to the standard processes (as reflected in corporate procedures) are appropriate to the program and should not increase cost, schedule, or technical risk. The offeror has made a corporate commitment and implemented plans for continuous process improvement.
- Major T&E reviews in support of the program's technical reviews (such as the TRR, preliminary design review (PDR), and CDR) are clearly identified.
- A single T&E authority for the program has been identified. The T&E team's roles and responsibilities within the offeror's proposed organization have been clearly defined and assigned.
- The skill, security clearance, experience level, and corporate commitment of key proposed T&E personnel have been ascertained. Plans for transition and personnel assignments are in place for a smooth ramp-up of work tasks without risk of delays. Sufficient manpower resources have been identified and are available to support the program.
- Key T&E processes critical to program success have been integrated with program management, and engineering processes reflect the T&E approach in the TEMP.

3.3 Section E of the RFP: Inspection and Acceptance

Section E of the RFP includes inspection, acceptance, quality assurance, and reliability requirements. A question for consideration is: *Has the acquisition team developed a tailored quality assurance surveillance plan to monitor contractor performance?* This section should describe the organization and procedures to perform the R&M task.

3.4 Section F of the RFP: Deliveries of Performance

In Section F of the RFP, the KO will specify the requirements for time, place, and method of delivery of performance. Questions for consideration: *Has the required number (sample size) of test articles been identified? Has a delivery location and schedule been established?* If you think you may want the contractor-acquired property, have the KO state in the solicitation and resulting contract that title to the contractor-acquired property will revert to the Government at the end of the contract. This section will identify the PM's desire to have contractor support personnel available to repair or provide reach-back of contractor's product during DT&E effort. Identify contractor property needed as spares during the testing.

3.5 Section H of the RFP: Special Contract Requirements

In Section H of the RFP, the KO will include a statement of any special contract requirements that are not included in Section I, Contract Clauses, or in other sections of the uniform contract format. All contract clauses for data delivery, Government property, rent-free Government property, and personnel qualifications should be reviewed. This information may reside in Section H or I or both sections.

3.6 Section I of the RFP: Contract Clauses

In Section I of the RFP, the KO shall include the clauses required by law and any additional clauses expected to be included in any resulting contract, if these clauses are not required in any other section within the uniform contract format. An index may be inserted if this section's format is particularly complex. All contract clauses for data delivery, Government property, rent-free Government property, and personnel qualifications should be reviewed. This information may reside within Section H or I or both sections.

3.7 Section J of the RFP: List of Attachments

In Section J of the RFP, the KO shall list the title, date, and number of pages for each attached document, exhibit, and other attachment. Cross-references to material in other sections may be inserted as appropriate. This section should identify whether the TEMP is releasable to the contractor. If so, make sure the TEMP is provided to the contractor and listed in this section. Documents released to the contractor should be reviewed for security classification. Those documents non-releasable to the public should have a distribution list established so they can be viewed by the companies performing the work.

3.8 Section K of the RFP: Representations, Certifications, and Other Statements of Offerors or Respondents

Section K of the RFP includes those solicitation provisions that require representations, certifications, or the submission of other information by offerors. Requests for certain certifications that support the T&E strategy should be reviewed.

3.9 Section L of the RFP: Instructions, Conditions, and Notices to Offerors or Respondents

Section L of the RFP describes in detail the contents of each volume of the proposal. Inserted within this section of the solicitation are provisions and other information and instructions not required elsewhere to guide the offerors or respondents in preparing proposals or responses to RFIs. Prospective offerors or respondents may be instructed to submit proposals or information in a specific format or several parts to facilitate the evaluation. The instructions may specify further organization of proposal or response parts, such as administrative, management, technical, past performance, and certified cost of pricing data.

If the contractor will provide oversight for another contractor or direct work to another contractor, this section will describe what measures are planned or have been taken to reduce or eliminate potential organizational conflicts of interest. Section L of the RFP will:

- Describe the contractor test management structure for T&E, experience of T&E staff, the predicted staffing levels, and the application of T&E best practices.
- Define the responsibilities of the contractor and the Government during test planning (include contractor testing, DT, and integrated testing).
- Describe contractor's approach on technical data, including management, ownership, control, timely access, and delivery of T&E data, to include raw test data, to support the evolving technical baseline.
- Define CDRL and DIDs.
- Identify any T&E related data products that the contractor must provide.
- Determine applicability of DIDs in support of T&E efforts.
- Determine applicability of commercial certifications of material or product. *Does the RFP contain a top-level schedule depicting key T&E events?*
- Describe the allocation of M&S responsibilities between the Government and contractor and the expectations regarding the sources of M&S tools. *Has the acquisition team identified an industry day?*
- Define release of T&E assessment data to industry. Is the program or aspects of said program classified? If so, is contractor capable of storing, handling, obtaining, and controlling classified data? Are contractor T&E personnel cleared to review the program? Contractor should provide certification of classification capability along with designated personnel. Is the acquisition team providing a copy of or access to the program TEMP or T&E strategy?

3.10 Section M of the RFP: Evaluation Factors for Award

A successful offeror's proposal must respond to the requirements of the RFP. The proposal must be responsive to and consistent with Section L, Instructions, Conditions, and Notices to Offerors or Respondents. Section M is the standard against which the proposal will be evaluated and forms the basis for selection. To a large extent, the quality of the proposal is directly related to the clarity of the

Government's delineation of the technical requirements in the RFP. During the proposal evaluation, the Government team will establish the degree to which the contractor has implemented RFP requirements and proposed a sound technical program with high expectations for success. Table 3-1 provides a summary of eight T&E focus and evaluation areas to consider in the Section M evaluation factors. This list is not meant to be all-inclusive; however, the acquisition team should limit the number of evaluation factors to focus attention on areas most likely to be discriminators among proposals. The inclusion of too many or overly detailed evaluation factors will consume source selection resources without benefit to the source selection process. DoD Components and programs may have specific proposal evaluation criteria that are tailored to the unique circumstances of the acquisition program. Section M consists of the evaluation factors and how the contractor will be graded. Identify all significant factors and any significant subfactors that will be considered in awarding the contract and their relative importance.

Has the acquisition team mapped Sections L and M to the program supporting documents (AS/acquisition plan, TEMP and SSP) and requirements document (ICD, CDD, or CPD). Are minimum thresholds and maximum performance objectives clearly defined? Are requirements stated in certain terms such that evaluators will be able to assess whether the offeror meets or exceeds a particular outcome? What are the measures and metrics to evaluate qualification of contractor T&E personnel? Are critical program objectives reflected in the evaluation criteria? Many of the documents in the RFP evolve into the negotiated contract via the proposal and source selection process (see Figure 3-1).

TABLE 3-1 T&E Focus and Evaluation Areas

- T&E Best Practices
 - Offeror addresses the T&E approach across the program life cycle.
 - Offeror has proposed event-based tests and reviews with entry, exit, and measure of success criteria.
 - Reviews include participation by Government and industry T&E SMEs.
- Offeror's Capability
 - Offeror's domain experience (process and product) is applicable to the program.
 - Domain expertise is combined with application of offeror's best practices using experienced personnel.
 - Offeror demonstrates proven, positive past performance (in domain and process areas) that supports a high probability of T&E success on the program.
 - Offeror provides an acceptable DR process and database compatible with the Government's DR data requirements and database.
- T&E Planning
 - Adherence and application of corporate best T&E practices is inherent in the T&E approach.
 - T&E processes are integrated within the management and technical framework..
 - OT&E and JITC requirements are addressed (such as critical operational criteria, IA, SoS interfaces within the SoS and outside systems, and critical mission function).
 - Experimental design and analysis (i.e., DOE) and reliability growth planning processes and practices are used.
- T&E Baseline
 - Processes and resources (people, test ranges/facilities, instrumentation, and

domain infrastructure) are integrated to systematically mature the T&E performance baseline without duplication.

- Requirements management and traceability processes support the evolving T&E performance baseline.
- Metrics
 - Product metrics are linked with T&E performance baseline maturity.
- Award Incentives
 - Award incentives support maturing the T&E baseline and are linked to quality and delivery performance of the final product.
- Cost and Schedule Realism
 - Program budgets and cost estimates are realistic. Cost, schedule, and performance are balanced.
 - Cost estimates and schedule support the T&E strategy and approach in the TEMP.
 - The program's critical path is actively managed.
- T&E Data Access
 - Ownership, control, timely access, and delivery of T&E data, including raw test data, to support the evolving technical baseline are clearly established. T&E data are consistent with the program's technical and acquisition strategies.
- Cost-Effective Strategy Aligned With Integrated DT/OT Test Continuum

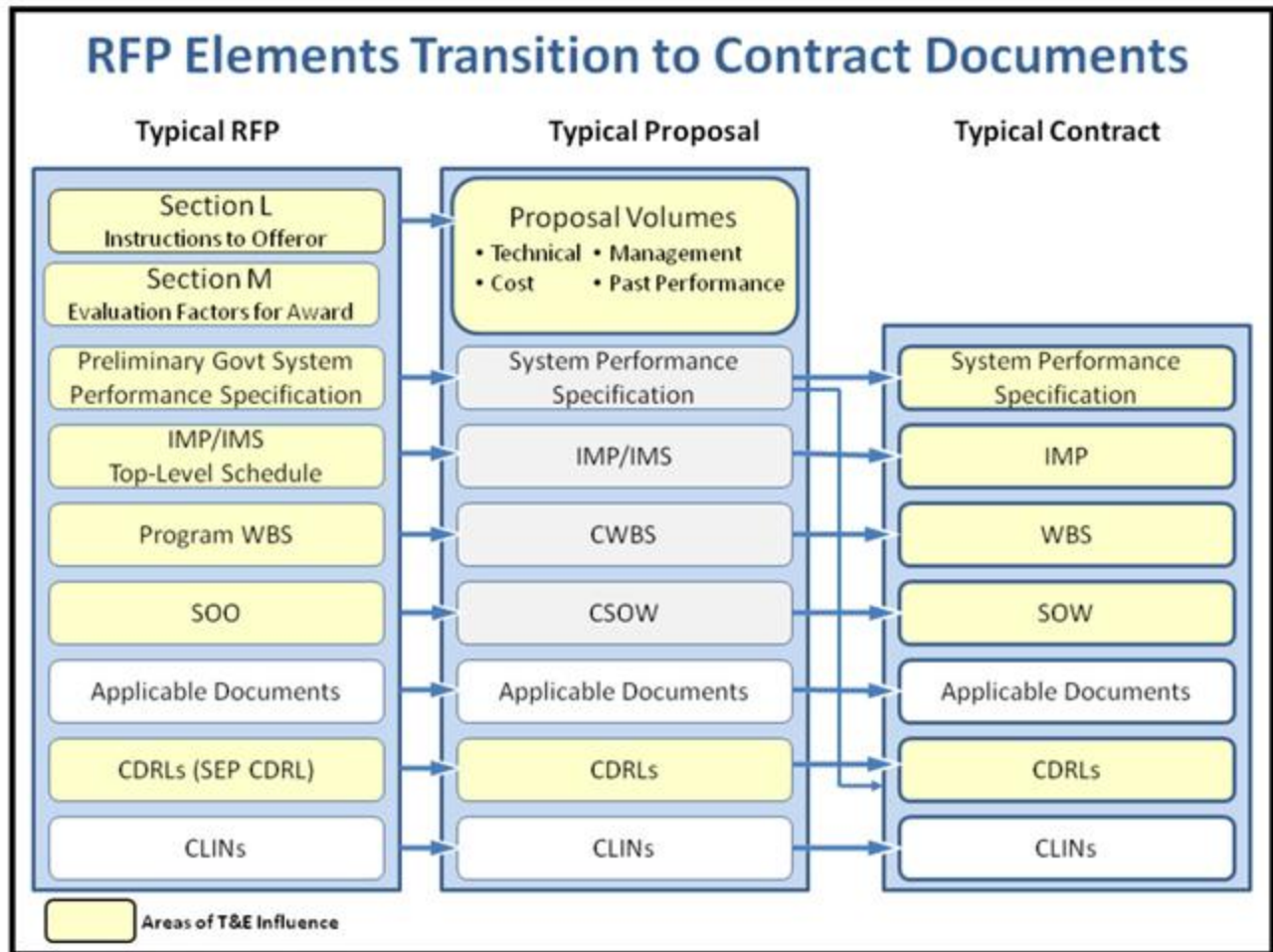


FIGURE 3-1 Relationship of Proposal Documents to Contract Documents

During the proposal evaluation, it is important that any changes or deficiencies in the proposal documents be corrected. The SSP delineates how the Government and the contractors will communicate during the evaluation process; for example, procedures for submitting questions or requests for clarifications and submitting a final proposal revision. The technical authority must ensure that any potential contractual documents are complete and sufficient. Usually the IMP, WBS, SPS, SOW, and CDRL are identified as contractual documents. Contract DIDs and CDRLs may be tailored to the acquisition program to obtain contractor-produced plans or studies that satisfy specific program needs. If the Government is expecting or relying on a contractor report to satisfy an acquisition milestone or decision review, then the CDRL should reflect a report delivery date in advance of the applicable review.

3.11 Overview of T&E Requirements

Sections L and M must capture the major thrusts of the T&E requirements described in the TEMP and other relevant T&E and acquisition documents. Section L of the RFP instructs the offerors on structuring their proposal and outlines what should be included in each section of the submittal. It should be written after Section M, and tracked to the evaluation factors. Sections L and M must mirror the SSP. The Government should avoid asking for unnecessary data in the proposal to satisfy technical curiosity because extraneous requests could cause the contractor's proposal team and the Government evaluation team to spend valuable time on areas not germane to the evaluation criteria.

The offerors will treat all data as critical. All data submitted in the proposal must correlate with the evaluation criteria in Section M or be necessary to award the contract (e.g., model contract, SOW, CDRL,

SPS). If the offeror's time and resources are wasted on unnecessary data, the quality of the proposal may suffer, potentially affecting the choice of the right contractor with the right approach.

3.11.1 Integrated Master Plan (IMP)/Integrated Master Schedule (IMS)

The RFP should contain an event-based, top-level schedule depicting the major program elements and key milestones, such as contract award, test phases, reviews, production, long-lead decisions, and system delivery.

The IMP and IMS should clearly demonstrate that the program is structured to be executable within schedule and cost constraints, and with acceptable risk. They should provide a functionally integrated picture of the proposed program. There must be a direct correlation between the event-driven activities in the IMP and IMS and the planned technical approach. Thus, the IMP and IMS are key elements to proposal preparation and source selection. There must be a high correlation between the cost basis of estimates (BOEs) and information within the IMS. Table 3-2 provides a sample RFP Section L for the IMP/IMS.

Table 3-2 T&E Content for RFP Section L – IMP/IMS

Section L = IMP/IMS

The offeror shall submit an IMP/IMS guide that is structured as an event-based planning document. Engineering reviews such as the system requirements review (SRR), system functional review (SFR), PDR, and CDR are typical. T&E shall support each review, as required, with appropriate performance data.

The IMP includes the accomplishments and criteria for the efforts involved with the design, development, test, production and sustainment including planned block upgrades, technology insertion, and entry and exit criteria.

The offeror's T&E processes and corporate best practices (as described for the program) shall be the source of the test events, definitions, major T&E products, and criteria for the IMP events.

The program's critical path is identified in the IMS. The result of a schedule risk assessment is presented and reflects acceptable schedule risk.

For programs that require an IMP that includes a process narrative section (IMP-IMS Guide, section 4.2.5): The offeror shall include within the IMP process narratives brief synopses of the offeror's processes considered essential for program success. The narratives shall reference the offeror's corporate T&E processes and best practices and indicate how they are applied to the program.

3.11.2 Management Volume

The management volume is used to highlight special areas that are discriminators for source selection. It should not be used to systematically address all technical and management processes to be used on the program. It should, however, provide a clear description of how the offeror plans to organize internally, interface with the Government program office and other external organizations, and manage subcontractors. This volume should include the approach to managing all program information (including T&E), its assembly and integration, and its dissemination among stakeholders.

The proposal instructions should avoid a reliance on a —cookbookll list of specific T&E management processes to be discussed and evaluated. The important issue is that the offeror's T&E processes and best practices are mature, integrated, and will be applied to the program. The focus should be on the key T&E processes that are important for program success. Examples of discriminating processes for a program might include an experimental design and analysis approach (i.e., DOE analysis), HSI and usability analysis, DR, DIACAP C&A according to Reference (q), T&E KPPs, COIs, critical operational criteria, CTPs, metrics and system reliability growth, software maturation, program and performance review processes, and M&S. Table 3-3 provides a sample Section L for the Management Volume.

Table 3-3 T&E Contents for Section L – Management Volume

Section L = IMP/IMS

The offeror shall submit a Management Volume that describes the key management and technical processes and their integration with the other management, financial, and functional processes.

This volume shall include discussion of processes, program organization, and special tools that are important to technical management; for example, program organization, and roles and responsibilities of IPTs and the T&E team.

The volume shall include T&E requirements management tracking tools, electronic and/or virtual program approach, special capabilities/facilities, data management/archiving/real-time access and data submittal, configuration management and supporting tools, M&S processes, and risk management processes.

The volume shall include the role of reviews in baseline management, and system validation and verification processes including failure/fix reporting and tracking.

3.11.3 Contract Data Requirements List (CDRL) and Data Item Descriptions (DIDs)

CDRLs and DIDs may be tailored to the acquisition program to obtain the following contractor-produced documents that satisfy specific program needs:

- CDRL. In this section, any T&E-related data products that the potential contractor must produce are identified. This may include plans, metrics, reports, artifacts, raw test data, or other T&E documentation. The CDRL will delineate the specific M&S items and data products, and the timelines to provide these to the designated test organizations.
- DID. Any DIDs applicable to the T&E effort should be included in this section. A DID is a completed document that defines the data required of a contractor. The document specifically defines the data content, format, and intended use. Each T&E team will have to determine the need for DIDs supporting their effort. To determine whether a T&E DID already exists, go to the Acquisition Streamlining and Standardization Information System (ASSIST) Website at <https://assist.daps.dla.mil/online/start/>. ASSIST is the source of DoD specifications and standards. Examples of T&E DIDs are:
 - DI-NDTI-80566A – Test Plan. The test plan outlines the plans and performance objectives at every level of testing on systems or equipment. It provides the procuring activity with the test concept, objectives and requirements to be satisfied, test methods, elements, responsible activities associated with the testing, and the required measures and recording procedures to be used.
 - DI-NDTI-80809B – Test/Inspection Report. This DID contains the format and content preparation instructions for the data product generated by the specific and discrete task requirement as delineated in the contract.
 - DI-NDTI-81585A – Reliability Test Plan. This plan describes the overall reliability test planning and its total integrated test requirements. It outlines required reliability tests, their purpose, and schedule. This document will be used by the procuring activity for review, approval, and subsequent surveillance and evaluation of the contractor's reliability test program.

3.12 General Factors

To accommodate variations among the DoD Components' source selection processes, RFP format nuances, and differences among programs, the discussion of Sections M and L is segmented into four general factors: (1) management, (2) cost factor, (3) past performance factor, and (4) cost factor or pricing data. Each of these areas includes a brief discussion of the topic and sample language (in shaded boxes) that can be applied to program RFPs.

Section M of the RFP states the evaluation factors and significant subfactors (and their relative importance) that are the basis for selecting the source. Section M should be written before Section L, and should be carefully structured to address only those elements determined to be keys to success. Taking into account early industry input, focus the Section M criteria on the source selection discriminators required to select the best value proposal with acceptable program risk. Do not include proposal evaluation criteria that do not add value to the source selection. Weigh each lesson learned from previous programs and RFPs (especially similar programs) when establishing RFP requirements.

Sections M and L should be specific to each program, giving consideration to the scope and the nature of the technical program, maturity of the relevant technology, critical subcontract or teaming efforts, software content, and COTS/non-developmental item. The task for the Government team is to provide the one-for-one match between the Section M criteria that will be used to evaluate the technical information and the proposal instructions in Section L. Normally, there are three primary considerations:

- Offeror's plans for implementing and managing the T&E process.
- Offeror's technical approaches (program and specific product offering), including supporting data (trades and analyses).
- Offeror's past performance.
- The most effective criteria are measurable and relevant to the program, traceable, and under the offeror's control. The Government team should answer the following questions when developing specific program-related criteria for Sections M and L:
 - How can the evaluation team develop confidence that the offeror's proposed T&E solutions, including unprecedented high-risk solutions (e.g., lack of proven technical maturity), will effectively measure performance and can be implemented within technology, cost, and schedule baselines?
 - How will the evaluation team establish an understanding of the offeror's T&E approach?
 - How can the evaluation team understand whether the specific plans for implementing and managing the T&E processes were based on company best practices, domain experience, and company maturity ratings?
 - How will the evaluation team understand whether the T&E solution is adequately supported by trade studies, LDTs, analyses, M&S, and demonstrations? How will the evaluation team determine whether the supporting trade studies, LDTs, trade criteria, and analyses are the results of the T&E process during proposal preparation? Is there objective evidence that the offeror used the processes proposed for the program?
 - How will the evaluation team determine that relevant and demonstrated past performance from other programs is applicable to the T&E processes for the proposed approach (e.g., successful performance on similar complex systems)?
 - How will the evaluation team assess the maturity and application of the offeror's proposed processes in the proposal risk assessment?
 - How will the evaluation team determine that the T&E costs and resources (especially number of operators, sample size, tests, ranges, and usage schedule and sequence) proposed for the system/subsystems are reasonable and realistic for the planned T&E approach? Is a scientifically based test design process such as DOE used?
 - How will the evaluation team establish that the offeror's proposed T&E schedule and

critical path analysis are realistic and represent the planned T&E approach consistent with the overall program schedule?

- How can the evaluation team understand the trustworthiness of any M&S proposed for use in the T&E process?

It is common practice to include a matrix in the RFP that correlates Section L to Section M so it is perfectly clear what portions of the proposal will be used to evaluate each Section M evaluation criteria element. Doing so also serves as a quick check to make sure that each element of the proposal tracks to source selection criteria. Figures 3-4 through 3-8 include sample content for Sections M and L for each subject that needs to be integrated with the rest of the information in Sections M and L in the program's RFP.

3.13 Technical Factors

T&E team members should be involved in the review and assessment of the technical portions of the source selection. This review generally involves the following:

- The offeror's proposed technical solution.
- The technical data supporting the offeror's proposed technical solution and how it meets the specification requirements.
- The SPS (or equivalent).
- The review document, the TEMP, or equivalent.

The core of the technical evaluation centers on the offeror's SPS, the technical solution of the approach, and any supporting trade studies, LDTs, analyses, modeling, and demonstrations that have been requested in Section L.

Most RFPs request two general types of technical data: the description of the proposed solution, and trade studies and analyses. The proposed solution and resulting performance are program specific and represent the bulk of the technical data submitted. This section includes drawings, flow diagrams, technical descriptions, and illustrations or photographs of the offeror's proposed solution. This important information is, in essence, the result of the engineering processes to include DT&E processes implemented by the bidder during the proposal phase.

The trade studies and analyses (including M&S) provide substantiating data showing not only the performance but also the extent and scope of alternative solutions considered before arriving at the proposed solution and specification. A well-structured family of trade studies, analyses, and M&S that supports the system configuration and its performance is objective evidence that the bidder has implemented its engineering processes described in other sections of the proposal. The Government should ask for a summary of the trade studies, LDTs, and analyses that discuss the scope of the alternative solutions and performance capability considered before arriving at the proposed solution and specification. Many times —whyll something was discarded is as important as —whatll was selected. The trade study, LDTs, and analysis data clarify the inner workings of the offeror's processes. The data demonstrate the application of the offeror's requirements analysis process and are evidence that the offeror:

- Has engineering and T&E processes.
- Has applied them in arriving at a solution.
- When coupled with other documents in the proposal, is committed to continue the processes during execution of the contract.

Tables 3-4 and 3-5 provide sample content for Sections M and L for the supporting T&E data, which need to be integrated with the program-unique parts of Sections M and L.

Table 3-4 T&E Content for Section M – Supporting T&E Data

Section M – Supporting T&E Data

This supporting T&E data factor (subfactor) is met when the offeror's proposal demonstrates the following:

1. The offeror conducted a series of trade studies, LDTs, M&S, and analyses that systematically evaluated the full range of alternatives. The results support the technical and program requirements and validate the proposed configuration and its performance.
2. Trade study and LDT processes were uniformly and consistently applied and followed the offeror's documented corporate processes as applied to the program in the TEMP.
3. Trade study and LDT criteria addressed the critical cost, technology, risk, and performance requirements/constraints for the program.
4. Recognition that an RPP is required to understand Government requirements and the need to design and test for product/system reliability.

Table 3-5 T&E Content for Section L – Supporting T&E Data

Section L – Supporting T&E Data

The offeror shall provide a summary of the T&E trade studies, LDTs, M&S results, and product/system reliability and analyses that were accomplished to arrive at the proposed solution. The offeror shall discuss the approach to the following topics:

1. The trade studies, LDTs, analyses, and M&S processes.
2. A summary of the trade studies and LDT results that support the proposed solution and program T&E approach.
3. A description of the trade study and LDT criteria, their relation to the key performance requirements/constraints for the program, and the planned processes addressed in the TEMP. The data shall address the range of alternatives considered and the important results that support the T&E strategy and approach decisions.
4. The process for developing and implementing an RPP.

3.13.1 System Performance Specification (SPS)

A preliminary SPS that defines the Government's performance requirements for the system is normally included in the RFP. The offeror normally responds with an SPS in the proposal. This specification includes the Government requirements plus any derived requirements necessary to describe the system-level performance. It may include allocation of requirements and should include corresponding verification requirements. The SPS should not include SOW language, tasks, guidance, and data requirements but should reference necessary industry and approved military specifications and standards.

Offerors responding to the RFP have a tendency to parrot back the Government's preliminary SPS in the proposal. They are hesitant to revise the content and format and are especially hesitant to respond with revised requirements for fear of being judged nonresponsive. The Government should make clear in the solicitation that the offerors need to do so. The RFP should clearly delineate whether the Government is receptive to considering revised, cost-effective performance requirements (trade space), along with an indication of how the value to the Government will be established and evaluated. The system

specification will be included in the contract.

In past practice, one particular element of the system specification has received limited emphasis—section 4.0, Verification and Test. The offeror must supply more than a simple table indicating the method of verification (analysis, inspection, simulation, test, or demonstration). Section 4.0 of the specification, along with the system test plan, IMP/IMS and TES/TEMP, should provide the insight to understand the method and extent of system verification. An incremental buildup approach to testing, including the T&E success criteria for each increment starting at subsystems of the system hierarchy, should support minimizing the system test events and activities. Section 4.0 of the system specification should reflect this T&E philosophy. Tables 3-6 and 3-7 provide sample content for Sections M and L for the SPS. These samples should be modified for the program and integrated with the rest of the RFP's Section M.

Table 3-6 T&E Content for RFP Section M – SPS

Section M – SPS

The offeror's SPS will be evaluated in conjunction with the technical solution based upon the following:

1. Specification includes the key requirements and functionality identified in the RFP's preliminary SPS stated in performance terms.
2. Requirements are verifiable by test, analysis, demonstration, or inspection and are supported by sufficiently mature technology (as defined by a technology readiness level (TRL) for the type of system under development, and dependent on the type and phase of acquisition (i.e., for an advanced concept technology demonstration, pre-MS B, exploratory technology).
3. Objective values (goals) are clearly identified and distinguished from firm threshold requirements.
4. Operational environment is described and defined in which the system, SoS, and/or family of systems (FoS) operates.
5. Environmental and safety design requirements and/or constraints are specified.
6. Functional and physical interfaces for the system are included.
7. Government and industry specifications, standards, and guides are used appropriately. Only approved Government documents should be referenced.
8. Test, verification, and reliability approaches for all system requirements included in the specification are complete and appropriate.
9. The specification does not include unnecessary requirements/language. (Examples include SOW tasks, data requirements, product or solution descriptions.)
10. The requirements are achievable within the planned program schedule and cost.

Table 3-7 T&E Content for Section L – SPS

Section L – SPS

The offeror shall propose an SPS that meets the Government minimum requirements. The specification should be performance based and address the allocation of Government performance requirements plus any derived requirements necessary to describe the performance of the integrated system solution. It should not be a mere —parroting back of the Government's preliminary SPS but keyed and tailored to the individual solution of the offeror. Key elements to be addressed in the SPS are as follows:

1. Accurate and complete understanding of the key performance requirements (e.g., KPPs) in the Government's preliminary SPS included in the RFP.
2. Derived requirements necessary to document the system performance that will govern the design, development, and test program (e.g., CTPs).
3. Identified and documented system-level interfaces that define the operational, physical, and functional interfaces that define the program external interfaces and constraints (e.g., approved operational, functional, and/or system architectures).
4. Verification section to the specification that delineates the approach to verifying performance, success criteria, and key characteristics, including reliability metrics.
5. A cross-reference matrix showing the tracking of Government performance requirements to the offeror's proposed SPS. The specification should be structured for the proposed system solution and not restricted by the structure of the Government's preliminary SPS. In general, the offerors follow the structure and organization of the Government preliminary SPS when preparing the proposal's SPS. This may lead to an awkward specification structure if the offeror's breakout of the product differs from the Government's top-level breakout. It should be clear in Section L that the format of the Government preliminary SPS is to be followed or that the offeror has the latitude to restructure the specification to conform to its proposed technical approach.

As discussed in section 2 of this guide, the source selection technical evaluation is primarily focused on the offeror's proposed SPS, product-offering technical solution description, and supporting data.

The following 11 areas need to be considered during the technical performance proposal evaluation and must be consistent with evaluation criteria contained in Section M:

- All the critical or key requirements must be included within the specification.
- Goals are appropriately identified and differentiated from firm requirements. Goals do not have as much standing as contract performance requirements.
- Specification requirements are stated in performance language.
- SOW tasks or data deliveries are not in the specification.
- The SPS verification and test section (section 4) should be more detailed than a table reflecting only a method of verification. There should be a one-to-one correlation with the performance requirements (section 3), and it must reflect the engineering and test approach documented in other sections of the proposal.
- System hardware and software interface requirements should be identified and documented. They become critically important constraints on the system.
- Watch for "parroting" of the Government requirements without regard to substantiating evidence in the other sections of the proposal. A claim of performance without substantiating data is a technical risk.
- The product offering is complete, meets performance requirements, and is supported by hardware and software demonstrated in a relevant operational environment.
- The product reflects special design considerations such as MOSA, safety, and security.
- Analyses, M&S, and trade studies support design decisions and technical approach to the program as defined in the offeror's T&E approach.
- The processes should systematically address the technical challenge. The effort should be comprehensive (e.g., include all relevant solutions, technologies, and/or alternatives) and address the areas of technical performance, cost, schedule, and risk.

3.13.2 Management Factor

T&E management, design, integration, and verification/validation processes are normally evaluated using

a combination of the offeror's SOW, TEMP, IMP/IMS, and management volume, as directed to be submitted with the proposal. The purpose of the evaluation is to establish the following:

- The offeror's domain current and past performance and experience.
- The stability and maturity of the offeror's T&E processes and best practices.
- That valid and complete approaches to test and evaluate the proposed system/subsystem are consistently integrated throughout the program

Table 3-8 provides sample content for Section M for technical and management integration. An integrated example is provided because there is significant overlap of all these elements. Individual Section L examples are included within each subsection.

Table 3-8 T&E Content for Section M – Technical and Management Integration

Section M – Technical and Management Integration

This factor (subfactor) is met when the offeror's proposal demonstrates the following:

1. The program tasks are complete and include a comprehensive description of the engineering and test tasks. Technical and test planning is complete, supports implementation of the program's technical strategy, and supports accomplishment of the requirements and objectives contained in the proposed contract. Plan for the management of technical and performance baselines and requirements using a tool set applicable to the program.
2. T&E processes are mature, stable, and represent the program's application of corporate best practices and lessons learned.
3. Approach, tasks, processes, and procedures are flowed down to the subcontractors, vendors, and other teammates. A trained workforce (familiar with the processes, practices, procedures, and tools) is available or in place to ensure accomplishment of the work.
4. T&E processes, products, and events are included in the IMP/IMS and reflect the program technical approach. The IMP narratives include the T&E processes and subprocesses; for example, requirements management and tracking, performance baseline control, interface management, configuration management, test data management, validation and verification process, failure reporting and corrective action system, and risk management.
5. The IMS clearly indicates the program's critical path and has acceptable schedule risk.
6. The T&E meetings, test events, status reviews, and design reviews are identified, participation is established, and schedule is set up to monitor and control T&E progress and support the technical progress.
7. A single T&E authority is responsible for program T&E direction with lines of responsibility and authority clearly established. Key personnel are assigned and personnel resources are identified. The role of the Government (program office, supporting Government organizations, and user) along with the key subcontractors has been identified.
8. Computer-based or software tools that are used for T&E management are real time (or near real time) and accessible to all program participants. Processes, procedures, and tools for test data archiving and data deliveries are secure and accessible to appropriate program participants. The tasks, activities, and methods are in place to facilitate the Government's timely access to the necessary program T&E.
9. System-level T&E reviews and meetings are adequate to monitor and control T&E

progress in support of the technical progress. IMP events include T&E milestones consistent with the technical and support strategy for the program. The approach to event-based reviews is sound.

10. Evaluation product metrics address the key product performance requirements. The —leading and lagging metrics provide past progress, current status to aid day-to-day management of the program for timely decision, and future projections. Root cause analysis processes are in place to continually improve the T&E processes and subprocesses. Tracking and reporting T&E progress and performance metrics at major program reviews are in place to ensure consistent application and continuing maturity of essential program processes (technical, configuration and data management, quality, subcontractor management, manufacturing, risk management, test and verification).
11. Program working groups are established that effectively involve program participants to improve coordination with supporting organizations and streamline T&E and other decision making.
12. The offeror's approach is based on corporate procedures and addresses the critical T&E areas within the program. The plans are flowed down to the teammates, subcontractors, and vendors involved in the program. The plans are consistent with the SOW, SEP, IMP/IMS, and other program management plans and processes to support critical path analysis, EVM, and risk management.
13. Along with strong technical, logistical, and contracting leadership, the program team has experienced T&E subject matter expertise as the program moves through its steps in contract formulation and execution. The Lead for T&E is involved with the KO in the program acquisition planning process as early as possible.

The management factor is typically evaluated using a combination of the offeror's SOW, IMP/IMS plus IMP narratives, and management volume.

3.13.3 Price or Cost Factor

Government source selection teams have placed more emphasis on evaluating the reasonableness of the offeror's proposed price or cost. Considerable emphasis has been placed on cost estimating, parametric analysis, BOEs, and the use of historical and past performance data on topics such as software code, hardware design complexity, T&E, and manufacturing costs. However, T&E tasks and costs have not been subject to the same analytical attention or scrutiny over the years. T&E personnel should consider the following five areas in support of the cost proposal evaluation:

- The T&E cost estimates correlate with the proposed solution and T&E program. Make sure that the program proposed is the one in the cost estimate and that it is reasonable and realistic. The program cost, schedule, and performance must be balanced and synchronized.
- The processes, organization, T&E tasks, and products proposed in other sections of the proposal are adequately resourced and included in the cost.
- Cost estimates for T&E work and products are supported by the offeror's domain experience and past performance.
- T&E manpower estimates and BOE must be adequate and reasonable for the organization, tasks, and schedule as reflected in the IMP/IMS and SOW. The skill level of the proposed manpower should reflect the complexity of the tasks. BOE supporting rationale should be based upon credible historical data, past experience, and/or expert judgment.
- Time phasing of the resources (manpower, facilities, and infrastructure) must be consistent with the IMP events and the IMS tasks and the TEMP's T&E approach.

Because costs are normally provided by WBS element, the program work breakdown structure (PWBS) is a valuable tool in understanding the cost proposal. The Government normally includes a PWBS based on

Reference (bb) in the RFP. This PWBS must contain elements for T&E tasks along with the other elements (e.g., product, engineering, and sustainment). The RFP directs offerors to expand this Government PWBS into a contract WBS.

3.13.4 Past Performance

In a competitive environment, the Government relies upon the offeror's past performance record to demonstrate that the team possesses the skill and experience to perform well on the new contract. To gain this confidence, source selection groups, such as the Air Force Performance Confidence Assessment Group, use a structured approach driven by the respective source selection evaluation criteria to ensure that they fully understand each offeror's strengths, weaknesses, and risks. This, in turn, will allow the source selection team to project how those strengths and weaknesses will affect the proposed effort. T&E planning, leadership, and execution must have a prominent role in the Section M factors and subfactors and must be considered in the past performance evaluation. A contractor with experienced personnel in the applicable domain, bolstered with a credible past performance record, should result in better contract performance (e.g., lower risk and cost while still achieving the user's performance requirements). Table 3-9 shows a sample Section M, Table 3-10 provides an example of a rating scale, and Table 3-11 shows a sample Section L.

Table 3-9 T&E Concerns for Section M – Past Performance

Section M – Past Performance

The source selection group conducts a past performance assessment that evaluates the offeror's recent and relevant experience as a prime contractor or subcontractor, as well as the performance demonstrated by divisions and subcontractors that will participate in contract performance if the offeror's proposal is selected. Based on the assessment, the source selection group determines a confidence rating indicating the probable level of successful performance in planned effort, and identifies issues that may be a concern for the procurement.

Table 3-10 provides an example of typical past performance confidence assessment criteria and rating scale. DoD Components may have their own and more expansive assessment criteria, especially when considering C4ISR systems, SoS, or FoS experiences.

Table 3-10 Example of a Rating Scale for Past Performance Performance Assessment Criteria

| Performance Assessment Criteria | |
|---------------------------------|---|
| Rating | Description |
| High Confidence | Based on the offeror's performance record, the Government has high confidence the offeror will successfully perform the required effort. |
| Significant Confidence | Based on the offeror's performance record, the Government has significant confidence the offeror will successfully perform the required effort. |

| | |
|-------------------------|--|
| Satisfactory Confidence | Based on the offeror's performance record, the Government has confidence the offeror will successfully perform the required effort. Normal contractor emphasis should preclude any problems. |
| Unknown Confidence | No performance record is identifiable. |
| Little Confidence | Based on the offeror's performance record, substantial doubt exists that the offeror will successfully perform the required effort. |
| No Confidence | Based on the offeror's performance record, extreme doubt exists that the offeror will successfully perform the required effort. |

Table 3-11 T&E Concerns in Section L – Past Performance

Section L – Past Performance

A source selection group is convened to accomplish a performance risk assessment of offeror's relevant contract performance. The offeror's T&E performance record determines what level of confidence the source selection group has in the ability of each offeror to perform all aspects of the contract, to include T&E. Offerors must submit information on contracts considered relevant in demonstrating the ability to perform the proposed effort including rationale supporting the assertion of relevance. Section M evaluation factors and subfactors will be used to evaluate past performance and assess performance risk.

Most past performance assessments include a questionnaire that requests specific information relative to a contractor's past performance from selected previous customers of the offeror. Questions specifically for technical planning, leadership, T&E, and execution should be included when appropriate. See Appendix C for a sample past performance questionnaire.

Not all contracts included in the offeror's past performance volume need to be —highly relevant to past performance, but a few examples should be highly relevant to the planned effort. See Subpart 15.305(a)(2) of Reference (e) regarding evaluating past performance and mandatory and discretionary requirements. Having limited T&E of a similar system, limited past performance results, or lack of domain experience can be a serious risk.

The T&E team needs to consider the following six areas in support of the past performance proposal evaluation:

- Focus on those contracts that are relevant or highly relevant and closely evaluate whether the performance is clearly applicable to the proposed program. Contracts that are similar in scope, apply the same corporate processes, and present successful results are the most powerful evidence of past performance.
- Review the allocation of T&E tasks to teammates and subcontractors and determine that their T&E experience is relevant and connected to the past performance examples.
- Most past performance evaluations include a questionnaire sent to select previous customers. Evaluate responses against the technical and management evaluation criteria in Section M.

- Systems engineering, and associated T&E, is a required element in Government acceptable contractor performance assessment reports (CPARs). This information is available to the past performance evaluation team. Trends and systemic issues across several contractor performance evaluations may indicate potential strengths and/or weaknesses in expected performance.
- For any past program evaluation rated as low, determine whether there is a —corrective action plan between the Government and contractor and whether the corrective action is on schedule. Low contractor performance assessment rating with no corrective action plan is an indicator of risk.
- The team should evaluate not only the information provided by the offerors but information obtained from other sources (e.g., CPARs, questionnaires, internal Government information).

There are two Section J attachments for past performance: past performance questionnaire and previous contracting efforts. Previous contracting efforts are previous or ongoing acquisitions that are recent and relevant to the current acquisition. The past performance evaluation panel should access the Past Performance Information Retrieval System (PPIRS) at www.ppirs.gov for CPARs.

3.13.5 Proposal Risk Assessment: T&E Risks

Normally, the source selection team establishes a proposal risk for each of the factors established in Section M. The proposal risk is typically established at the factor level; for example, technical and management; however, the risks are identified at the subfactor level and summed to the factor during the evaluation. This risk assessment establishes the risk associated with the offeror's proposed program to include the technical approach, technical performance, testability and measurability of the performance requirements, management approach, application and integration of management and technical processes, program schedule, and cost/resource allocations. The following is a list of nine considerations when assessing the risks during the proposal risk assessment:

- Claims of performance are supported by credible analyses, trade studies, LDTs, and/or M&S results.
- The offeror's domain experience supports the program approach and the T&E challenges on the program.
- The T&E processes and best practices are mature and stable, and modifications to the standard processes (as reflected in corporate procedures) are appropriate to the program and should not increase cost, schedule, or technical risk.
- T&E processes are stable and mature, including technical hardware and software readiness levels (TRLs), maturity ratings (e.g., for MS B, a TRL of 6 is required), common discrepancy reporting criteria, and corporate plans for continued process improvement are in place.
- The key T&E processes determined critical to program success have been integrated into the program management and T&E approach. Examples include configuration management, requirements management, performance baseline control, risk management, technology insertion/obsolescence planning, data management planning, and M&S planning. These are flowed down to teammates, subcontractors, and vendors.
- The T&E processes, as appropriate, are integrated with the other functional processes (e.g., systems engineering, acquisition, and M&S).
- The risks associated with executing the T&E activities have been evaluated with respect to their relationship to the program's critical path.
- The risks associated with the offeror's costs are consistent with their proposed T&E effort, tasks and products, organization and personnel resources, and personnel experience levels.

- The T&E program schedule is reasonable and realistic and is consistent with the planned execution of the program; the T&E activities are on or near the program's critical path and are supported by the offeror's past performance.

4. Contract Execution

The contents of this section will focus on and consider the most important contractual T&E items transition from the solicitation phase to contract execution.

The keys to contract success are sound leadership, sound planning, and application of the contractor's corporate processes during execution. The T&E processes will develop, capture, document, and archive all of the T&E data. The T&E processes must be tightly integrated with the engineering and management processes and schedules that control the conduct of the program that will ultimately define, produce, and deliver the product to the user.

Program start-up can be hectic. New personnel are assigned, facilities are being established, and during all this turmoil, real program work needs to be accomplished. Program start-up and personnel ramp-up are almost always risk areas. It is essential that the program quickly transition into execution. During the first few weeks after contract award, it is important that the Government and contractor T&E team have an interactive face-to-face meeting, usually the kick-off meeting, and that the T&E leaders step forward and set the tone for the program. Focus areas during initial meetings with the contractor should include the following eight topics:

- Leadership completing the merger of the Government and contractor T&E personnel into a functioning integrated team; recognition of the responsibilities inherently residing with the contractor and Government (program office, user, evaluator, tester, and DCMA). T&E SMEs can participate in a variety of different teaming arrangements, including oversight teams, requirements teams, program management teams, and program-specific teams such as a CTF, CTT, or ITT. Regardless of the team's title, the team can have a T&E-specific focus, or not. The charter is the key document to define the team structure and should list the roles, responsibilities, products, and membership.
- Review of the program T&E strategy and approach and contractor and Government testing responsibilities.
- Review of the SPS, KPPs, and CTPs to ensure a mutual understanding of the functional baseline.
- Reinforcement of the importance of implementing the contractor's T&E best practices and domain experience.
- Review and establishment of the initial set of T&E product and process metrics.
- Review of the plans for event-based reviews (along with entry, exit, and measure of success criteria) documented in the IMP; review of the technical tasks and resulting products documented in the IMS; and ensuring T&E correlation with the SEP, IMP/IMS, and the EVMS in preparation for the integrated baseline review (IBR).
- Review and discussion of all the source selection T&E-related findings to ensure that they are resolved.
- Conduct of an IBR on contracts requiring compliance with DoD EVMS criteria requirements usually within 6 months after contract award.

4.1 T&E Team

At contract award, the Government/contractor T&E team must begin the integration into an organizational structure to promote the execution of the program's T&E processes and products. The authority for the Government and contractor must be clearly established. The contractor has likely identified a planned organizational structure in its proposal. The roles and responsibilities of Government personnel within the program's structure have to be defined and working relationships established. One of the first tasks is to make the appropriate assignments of Government personnel and to get the team physically together so introductions and working relationships can be established.

If the program organization includes a T&E WIPT, that team is often responsible for delivery of the completed TES or TEMP, JCIDS documents and operating concepts, and other T&E-related documents, and is responsible for the functioning of the T&E processes across the program. The team must be strong and staffed with experienced personnel from the Government and the contractor. The respective team uses the approved performance baseline (e.g., APB criteria) that is allocated to the product/system. The team is responsible for supporting the many major system reviews (SRR, SFR, PDR, CDR, etc.) with T&E results, and for risk assessments that will support the evolving technical baseline and product/system definition. Government participation on the respective teams is generally governed by the following eight guidelines:

- The Government does not lead or manage the contractor's T&E effort.
- Government participants serve primarily as —customer representatives, and one of their contributions is to reduce the cycle time of contractor/Government communications and decisions. The Government participants facilitate the Government's acquisition-related guidance and direction to meet program commitments in a timely manner.
- Government participants convey their knowledge/expertise on T&E approach, performance requirements, operations, maintenance, and other important topics.
- Government participants interface and coordinate the activities with other Government organizations that participate in the program, ensuring that they understand the overall T&E approach and that their participation supports program objectives.
- Government participants control and facilitate identification and delivery of GFE and Government-supplied data and services.
- Government participants should be participants in the risk management process.
- Government WIPT participants can offer personal and expert opinion from the customer's perspective; however, they cannot authorize any changes, waivers, or deviations to or from the contract requirements, which must be made by the KO.
- Government WIPT members cannot authorize contractors to perform work that is beyond the contract. Any such changes must be made by the KO.

4.2 Contractor Performance Information

Subpart 42.15 of Reference (e) identifies the requirement to record and maintain contractor performance information and requires the periodic assessment of contractor past performance. Up until 2002, most DoD Components used the CPAR. In July 2002, DoD endorsed the PPIRS as the single, authorized application to retrieve contractor performance information. PPIRS is a Web-enabled, enterprise application that provides timely and pertinent contractor past performance information to the DoD and Federal acquisition community for use in making source selection decisions. DoD Components should have some form of accepted documentation to record and maintain contractor performance information. Poor performance will influence source selection decisions and can result in non-selection. Excellent performance can significantly enhance the likelihood of winning a future source selection. Contractors are very sensitive to these facts and usually are motivated to improve poor performance. Used correctly and actively, contractor performance information can be an excellent management incentive tool.

4.3 Award Fee Implementation

There are several award fee activities that may require T&E involvement to sustain contractor and Government attention and interest in successful execution of the T&E approach to the program. These include interim and final evaluations for each award fee period, establishment of criteria for the upcoming terms, and providing feedback to Government officials and the contractor. It is particularly important to develop well-defined criteria applicable to each term, especially when an award fee is rolled over. (In rare cases, the fee determining official may agree to —roll overll unearned award fee money from one period to another to a subsequent term in accordance with Reference (u). The DFARS Service Supplements and Guides provide details regarding administration of award fee programs.

4.4 Defense Contract Management Agency Support

The fundamental responsibilities of DCMA include the following:

- Assess compliance with contractual terms for cost, schedule, and technical performance in the areas of design, development, and production.
- Evaluate the adequacy and perform surveillance of contractor engineering efforts and management systems that relate to design, development, production, engineering changes, subcontractors, tests, management of engineering resources, reliability and maintainability, data control systems, configuration management, and independent research and development.

Because DCMA is normally on-site with the contractor, it is uniquely situated to be involved in the day-to-day contractor activities. DCMA is intimately familiar with the inner workings of the contractor's capability, processes, personnel, and facilities. It can be the —eyes and earsll of the program office and can be a valuable asset to the Government Lead for T&E. The KO or PM may negotiate an MOA with the DCMA field office detailing the specific tasks related to program participation after the contract is issued. (Many contract administration functions are routinely delegated to DCMA. See Subpart 42.302 of Reference (e) and Subpart 242.302 of Reference (d) for details. This activity should include how DCMA will participate in the execution of the T&E processes, and enlisting DCMA support in the implementation of various management tools/systems (WBS, IMP, IMS, EVM). The following three topics should be clearly addressed early in the T&E approach development effort, as appropriate, to the product/system under development:

- **Production Acceptance T&E.** DCMA usually is responsible for production acceptance testing. This responsibility and process should be verified and captured in the T&E process and approach.
- **Flight Release.** DCMA usually issues the flight release (in the case of aircraft programs) that permits even DT aircraft to enter the flight test program. This responsibility and process needs to be captured early in the T&E effort and schedule for the decision points that lead up to issuance of the flight release.
- **Contractor Personnel Management.** DCMA will sometimes be the approving authority for contractor flight crews to fly in DTs. This issue and the related DCMA processes and policies regarding training and certifying contractors to operate the system being developed must be captured early in the T&E process and approach.

For DCMA-specific responsibilities associated with aircraft, or ground-aircraft related, programs go to DCMA Instructions 8210.1 and 8210.2 (Reference (dd)) or the DCMA Website at <http://guidebook.dcma.mil/>.

4.5 Test Operations

The actual execution of test events presents numerous contractor/Government detail-type issues that must be addressed to successfully complete the program and the contract. The following items are potential conflict areas and should be addressed early to ensure clarity and completeness as to contractor and Government responsibilities and expectations for the T&E effort throughout the acquisition process. These areas may or may not be specifically spelled out in the contract but should have been considered during the preparation of the SOW/PWS in some manner.

4.5.1 Change Management

Change is inevitable in any test program. Changes to product/system performance criteria (such as new requirements, deviations, and waivers to existing performance criteria) have to be clearly and completely documented, incorporated into the contract, and adhered to. There should be an approved change management process defining the authority controlling the change process and configuration management of test assets. This is sometimes called a configuration control process, but a distinction needs to be made between the configuration control process that is part of the systems engineering process and is focused on the design configuration and the configuration control process that is focused on test asset configuration. The latter process will include design changes in addition to deviations or waivers resulting from the production process, and even changes to the test instrumentation. The integrity of the test results rests on understanding and maintaining control of the configuration of the test assets as the test program progresses. Unknown or undocumented configuration changes can invalidate data and introduce safety risks. This is especially true with software changes. For more specifics on this topic, see Part 48 of Reference (e).

4.5.2 Reporting

This area requires a very clear contractual understanding and specifics that identify the type, format, schedule, and approving and coordinating authorities for all T&E reports. The contractor is obligated to deliver only the reports listed in the contract as CDRL.

4.5.3 T&E Team Responsibilities

The contract defines the responsibilities of the contractor versus the Government. However, the contract should not be expected to address all of the roles and responsibility issues that arise during the test program execution. It is the responsibility of all parties, but especially the Government representatives, to understand the roles, authority, and span of control of each of the team representatives. The contractor is required only to execute the contract and is not required to do anything above that minimum requirement. A contractor with total system performance responsibility is also responsible for any interface issues that may arise and should have responsibility for identifying any interface issues that may arise involving other contractors or with GFE or supplies. Otherwise, the issue of responsibility for addressing interface issues will need to be worked out on an ad hoc basis. The KO should be consulted to ensure that no constructive changes are incurred to the contract.

Other common issue areas include providing people, spares, and consumables. The responsibilities for data authentication and data access also need to be addressed.

Who will capture the raw data and convert it into useful data products? If the contractor is responsible for first-generation data processing (data authentication process), will the contractor be responsible only for the data that it intends to analyze, or will the contractor be responsible for processing all data and providing that data to the appropriate Government or contractor for analysis and evaluation? The contractor may interpret its responsibility as providing data authentication services only for specification compliance-related data, whereas the Government may have assumed that the contractor would provide authentication for all data. In this case, it may help to make it clear that even though the contractor will have to provide data authentication services for all test participants, it will be responsible for analyzing only the data necessary to show compliance with the contract.

4.5.4 Test Personnel

Because contractor and Government personnel work closely together during the execution of test events,

it is important to have a clear understanding of what each party is providing in terms of personnel and how they will be managed. The skill sets needed for executing the program need to be identified before the start of the test program. Depending on the product/system under test, there may be a requirement for some specific skill sets to fully exercise the product/system. Once the personnel requirement is established, the source of the personnel should be clearly established. For example, which skills will the contractor acquire for the test program, or from the Government? In some programs, the contractor brings the test managers and the Government provides the maintenance personnel. Whatever the actual arrangement is between contractor- and Government-supplied personnel, clear expectations need to be set as to skill sets and quantity of personnel.

In addition, the contractor and Government management roles and responsibilities must be clear. Do contractor personnel oversee operations with Government personnel? If so, what are the rules governing such issues as work-hour expectations and disputes?

Do Government personnel oversee contractor personnel? If so, how does the government keep from unintentionally making constructive changes to the contract? See subsection 1.3.16. of this guide for discussion of contractors supporting OT&E. Consequently, system contractor personnel may not participate in data authentication groups or RAM scoring conferences or act as data collectors, reducers, or processors.

4.5.5 T&E Team Participants

The participants in the T&E team include anyone and everyone necessary to successfully execute the test program, or anyone with a stake in the outcome of the test program. Different acquisition programs may have several teams working on T&E issues, but the basic issues to be addressed are management and execution.

The T&E WIPT is generally the team that addresses the approach and overall management of the T&E program, whereas a test team, or something similar, will handle the execution of the test program. The T&E WIPT will include all stakeholders for the approach and status of T&E. At a minimum, T&E WIPT participants include the PM and staff representatives, oversight organizations, contractor and major subcontractors, the responsible test organization, OTA/system evaluator, and appropriate user representatives.

T&E WIPT participants will provide the day-to-day management, execution, and logistics support necessary to plan, execute, analyze data, and report test results. T&E WIPT participants represent different levels of management and perhaps different detailed objectives, so good team management skills will be necessary to establish common goals, minimize conflict between team participants, and execute a timely, efficient, and effective T&E program.

4.5.6 Test Safety and Environmental Issues

The actual testing of equipment in a lab or on a test range introduces personnel safety issues and concerns. For example, the F-16 used hydrazine, a toxic chemical, for its emergency power unit. When the emergency power unit was tested on the ground, ground personnel near the aircraft were exposed to a potentially hazardous environment from hydrazine in the power unit exhaust, and when hydrazine was spilled during servicing of the aircraft, the safety-related aspects were not clear in terms of how to clean up the spill, safe exposure levels, etc. This example illustrates that Government and contractor roles and responsibilities for the conduct and approval of test-related safety issues and analyses need to be clearly defined. Note that in addition to safety analyses for personnel and test article risks, these analyses should also address environmental impacts related to the conduct of tests. Some of these environmental issues are at the State and local level, and the complete list of environmental laws may not be known prior to contract award. As a result, the contract needs to allow for these types of analyses and impacts on the execution of the test program. See section 4.47.1 of Reference (b). Reference (a) requires the PM to certify the safety of the system before Government personnel operate a system under test.

4.5.7 Risk Acceptance Authority

The conduct of safety analyses will assist in identifying and clarifying the risks involved in the test program. Detailed test planning should establish test conditions and test procedures to mitigate most of the significant risks. However, some residual risk will remain, and the question then becomes one of who has the authority to accept the residual risk and allow the test to proceed. The approval authority can be

different depending upon the levels of risk established (e.g., low, medium, or high risk).

For example, most flight tests involve a routine or relatively low level of residual risk, so the operations officer or the test team lead has the authority to approve a flight with that level of risk. However, flight tests such as high angle-of-attack (or stall) testing are usually considered to be high-risk tests because the aircraft behavior in the stall regimen is not well known, and the risk of losing the aircraft is considerable. In this case, the range commander or equivalent would be the approval authority for that particular test event. Because the approval (or lack of approval) to conduct tests is not within the contractor's control, the contract needs to account for that possibility. DoD Components may use different risk matrixes, such as 3-tier versus 4-tier or dollar/injury/mission impact thresholds. These different matrixes may also have their own risk decision authority levels. This becomes very important when contracting for an integrated testing program that will cross DT and OT lines, as well as multi-Service OT&Es.

4.5.8 Accident/Incident Investigation and Reporting

In the unfortunate event of an accident or incident, the accident/incident reporting and investigation procedures and process must be clearly defined. This process should include authority, documentation, and accountability for the test article in case of an accident/incident. For example, if a test aircraft crashes, who is going to be held responsible for that test article? Will the accident investigation be conducted according to Government procedures or contractor procedures? How is the contractor expected to support the accident investigation? Will the Government indemnify the contractor for the loss of the test asset, or is the contractor expected to procure insurance to cover the risk of losing the test asset?

4.5.9. Detailed Test Planning

This area refers to detailed test plans or the test plans that are actually constructed and used to execute the test events and acquire the necessary data. Higher levels of test planning, such as T&E strategies and system-level test plans, have more of a management focus and are not sufficiently detailed to actually execute a test event. Where actual test operations are concerned, the detailed test plans drive the actions of the testers. Therefore, the roles and responsibilities for the development of detailed test plans must be defined. This area includes processes for detailed test planning, especially with integrated testing; test plan authorship; and test plan approval. A key consideration is as follows: When the contractor writes the detailed test plans, how does the Government ensure that the contractor does not become responsible for doing more testing than is required for the contract? This issue is part of defining the Government's role in approving detailed test plans.

4.6. Test Execution

The roles and responsibilities for the actual conduct of a test must be defined; that is, essentially, to define who controls the conduct of tests – Government or contractor, or both. This area includes such items as deleting or adding test points, expectations for a particular priority when it comes to range or range asset availability, and contractor or Government run-through of the data collection instrumentation prior to the actual test to verify operational status.

4.6.1. Test Data Access, Authentication, and Sharing

The access to, process for authentication, and sharing of all test data must be clearly established. According to paragraph 2.c.(7) of Enclosure 6 of Reference (a), the government shall have full and timely access to all available developmental, operational, and live-fire T&E data, records, and reports. Government access to all test data should not be restricted, and the process to authenticate test data should be agreed upon. The contract should clearly describe the collection, authentication, and availability process. If a data authentication group is established, the contract must define who will be the leader, where the data will be stored, and how the authenticated data will be made available for all stakeholders. This is an area that will potentially invoke contractor intellectual property issues, so that part of the contract needs to be clearly understood by the test team.

4.6.2. Test Data Analysis and Evaluation

Data analysis and evaluation responsibilities, process, and products must be identified and adhered to throughout the testing effort. The process should clearly identify what the contractor is responsible for, as opposed to the Government, and the process for adjudicating conflicting evaluations. Especially in the case of integrated testing, considerable data will be collected. The contractor should be responsible for analyzing only that data that is sufficient to demonstrate compliance with the specification and SOW/PWS. This area requires a very clear contractual understanding and specifics to identify the type, format, schedule, and approving and coordinating authorities for all T&E reports. The required contractor reports should be listed as contract deliverables. For example, if the Government is expecting or relying on a contractor report to satisfy an acquisition milestone or decision review, then that information needs to be communicated to the contractor.

5. Summary

This guide provides the major T&E items or requirements to consider as T&E professionals develop or review a SOO, SOW, PWS, RFP, and contract. The various lists provide a baseline for discussions, decisions, and review for T&E items or requirements. These lists, combined with DoD Component-specific T&E direction, guidance, and requirements, should help developers and reviewers address all the necessary T&E contents for a SOO, SOW, PWS, and RFP for a program.

The key issue to remember: If a T&E item or requirement is not in the SOW/PWS, it probably will not be in the RFP. If it is not in the RFP, it probably will not be in the contract. If it is not in the contract,

do not expect it! T&E professionals must be involved early and stay involved with the PM, the KO, the SE, and the other program office leads throughout the contracting process to ensure that the T&E policies, practices, procedures, and requirements are understood, accepted, and included in the contract as necessary for program success.

Appendix A - Getting Started with Defense Trade

The Directorate of Defense Trade Controls (DDTC) and the Defense Trade Function

- I. Does Defense Export Controls Apply to Me? A Quick Action Checklist
- II. [Rationale for Regulating Defense Exports](#)
- III. DDTC – The Offices that Administer the Defense Export Regulations
- IV. [Authority for Control of Arms Exports](#)
- V. [U.S. Government Regulatory Measures](#)
- VI. [End-Use/End-User Monitoring](#)
- VII. [Other Compliance Mechanisms](#)
- VIII. D-Trade – Conducting Your Defense Trade Business Electronically
- IX. [To Learn More](#)

I. Does Defense Export Controls Apply to Me? A Quick Action Checklist

Find out if what you want to export (hardware, technical data, and/or defense services) is covered in the U.S. Munitions List (USML), found in Part 121 of the ITAR.

- Not sure if your desired export is covered by the USML? File a Commodity Jurisdiction request.
- If what you want to export is on the USML, you must be registered with DDTC.

- After you are registered, you may apply for an export license. D-Trade is the preferred way of licensing.
- Have basic questions you need answered? Call the DDTC Response Team.

II. Rationale for Regulating Defense Exports

The U.S. Government views the sale, export, and re-transfer of defense articles and defense services as an integral part of safeguarding U.S. national security and furthering U.S. foreign policy objectives. Authorizations to transfer defense articles and provide defense services, if applied judiciously, can help meet the legitimate needs of friendly countries, deter aggression, foster regional stability, and promote the peaceful resolution of disputes. The U.S., however, is cognizant of the potentially adverse consequences of indiscriminate arms transfers and, therefore, strictly regulates exports and re-exports of defense items and technologies to protect its national interests and those interests in peace and security of the broader international community.

III. DDTC – The Offices that Administer the Defense Export Regulations

The Directorate of Defense Trade Controls (DDTC), Bureau of Political-Military Affairs, in accordance with 22 U.S.C. 2778-2780 of the Arms Export Control Act (AECA) and the International Traffic in Arms Regulations (ITAR) (22 CFR Parts 120-130), is charged with controlling the export and temporary import of defense articles and defense services covered by the United States Munitions List (USML). To learn more about DDTC, please visit its Web site (www.pmddtc.state.gov).

IV. Authority for Control of Arms Exports (AECA)

The AECA provides the authority to control the export of defense articles and defense services. The AECA charges the President to exercise this authority, which has been delegated to the Secretary of State. The AECA is available through the DDTC Web site. The ITAR implements the AECA. These regulations are frequently updated and revised to reflect change in the international political and security climate, as well as technological development. The ITAR may be accessed on the DDTC Web site. In accordance with Executive Order 11958, the State Department, with the concurrence of the Department of Defense, determines what commodities are covered by the USML. Guidance on the commodity jurisdiction (CJ) function is available on the DDTC Web site. In addition to seeking technical support and national security assessments from the Department of Defense, the State Department relies on extensive interagency cooperation and coordination to perform the arms export control function. It:

- Works closely with U.S. Customs and Border Protection (review of defense industry registration, performance of defense export end-use checks, investigations, civil penalties);
- Works with the Intelligence Community to review alleged diversions and unauthorized transfers; and
- Cooperates with the Justice Department and U.S. Attorneys (pre-trial consultations, trial documentary preparation, expert testimony).

V. U.S. Government Regulatory Measures

For the U.S., licensing and compliance are two sides of the same coin, and there is constant interaction between the two functions.

- **Registration**
 - In accordance with the AECA, registration with the State Department (via DDTC) of all U.S. persons that manufacture or export defense articles, furnish defense services, or U.S. and foreign persons engaged in arms brokering, is required. The information submitted by registrants is reviewed by the Treasury Department to ensure there are no outstanding law enforcement concerns.
 - Registration does not confer any export privileges, but is a prerequisite to export licensing approval.
 - The registration process:

- Informs the U.S. Government about the U.S. defense industry (legal status, export eligibility, foreign ownership/affiliations, legally responsible personnel, areas of activity);
 - Serves as a channel to provide industry with information about export regulations and Government concerns; and
 - Helps validate the bona fides of U.S. firms engaged in defense trade, especially during the review of export license applications.
- Registrants, in accordance with the AECA, are charged a fee. Congress has created a mechanism that allows the State Department to retain the money collected to help support defense export control functions.
- **Licensing**
 - Department of State approval of a license application is required prior to the export of defense articles or defense services.
 - About 30 percent of the applications processed by the State Department are referred to other offices and agencies (e.g., the Department of Defense) for comment and recommendations. This is what is referred to as "staffing" the case.
 - During the review process, a computerized review of all parties to the proposed transactions is made against a "watch list" of known or suspected export violators. A "match" results in a full compliance review by the State Department before final action is taken on the application.
 - In addition to sorting through detailed technical specifications, the license application review process clarifies the ultimate end-use and end-user of the defense export, as well as facts related to intermediate handling.
 - From the enforcement point of view, the review process provides an avenue to prevent or eliminate diversions, and to assist the U.S. Government in investigations and prosecutions should an export violation be suspected or reported.
 - In submitting license applications, companies must certify eligibility to export and an understanding of the laws governing such exports. Moreover, in carrying out the physical act of exporting, they must meet certain conditions in terms of documentation (electronic reporting of export information using the Automated Export System, "AES") and handling (particularly of classified material).
 - Exporters must make clear on shipping documents that the defense export cannot be resold or retransferred without prior U.S. Government authorization – a licensing requirement that also involves compliance issues.

To learn more about licensing, and to view the various licensing forms, please visit the D-Trade Info Center and the "Licensing" page on DDTC's Web site.

VI. End-Use/End-User Monitoring

End-Use checks are key to the State Department's effort to prevent illegal defense exports and technology transfers.

End-use checks (known under the program name —Blue LanternII) enlist the help of U.S. diplomatic posts, the cooperation of U.S. Customs and Border Protection, and, most importantly, foreign governments in the conduct of pre-license checks and post-shipment verifications of defense exports.

End-Use monitoring reports are available on DDTC's Web site.

VII. Other Compliance Mechanisms

The U.S. Government spends considerable effort trying to prevent violations, via participation in industry conferences, Internet postings, and publication of regulations. When a problem arises, the Department of

State has broad authority to take action (i.e., suspend, deny, or revoke license approvals). Working with law enforcement agencies, it can prosecute criminally (possible prison sentences and fines) and independently can take civil action (e.g., fines and denial of export privileges). Remedial assistance/attention is also offered. The State Department works with companies to develop effective export compliance programs. DDTC makes available a guideline describing the basic elements of a compliance program via its Web site.

VIII. D-Trade – Conducting Your Defense Trade Business Electronically

Effective January 15, 2004, DDTC, through the use of the D-Trade electronic licensing system, is prepared to receive and adjudicate fully electronic defense export authorization requests properly submitted by any U.S. person who is a defense trade registrant and wishes to permanently export unclassified defense articles via the Form DSP-5, temporarily import unclassified defense articles via the Form DSP-61, or temporarily export unclassified defense articles via the Form DSP-73. Based on envisioned expansion of electronic processing capabilities, DDTC anticipates, with few exceptions, most export licensing submissions via D-Trade in the near future.

For more information on D-Trade, consult the D-Trade Information Center, accessed through the DDTC home page. There you will find links to more background information on electronic licensing.

IX. To Learn More

The DDTC Web site has more information that may be useful to you. The homepage has a comprehensive listing of links to information that can assist you in your defense exporting endeavors; in addition, consult —New Items and AnnouncementsII for the latest updates. If you have any questions about any aspect of the defense export process, please contact the DDTC Response Team.

Appendix B – Sample Checklist For Evaluating an RPP

This checklist (adapted from Reference (n)) is not meant to be all inclusive but rather serves as a tool to guide discussions and decisions relative to RAM planning, accountability, and reporting for your programs.

RPP

Does the program...

- Implement the reliability activities described within the RPP with appropriate methods, tools, and best practices, in order to accomplish the following four objectives: understand the Government's requirements, design product/system for reliability, produce reliable products/systems, monitor and assess user reliability?
- Include a reliability growth plan?
- Include procedures for verifying that planned reliability activities are implemented?
- Manage risks due to new technologies?
- Include decision-making criteria and plans for intensifying reliability-improvement efforts?
- Require periodic updates coordinated with the customer/user?

System Reliability Model

Does the program...

- Build and refine model throughout the life cycle?
- Routinely update the model as failure definitions are updated, failure modes are identified, operational and environmental load estimates are updated, and design or manufacturing changes are made?
- Include detailed component stress and damage models?

- Use the model to (1) update allocations, (2) aggregate reliability, (3) identify single points of failure, and (4) identify critical reliability items and the need for additional design or testing activities?

Systems-Engineering Integration

Does the program...

- Integrate reliability activities with the systems engineering process throughout the life cycle?
- Incorporate reliability improvement actions routinely during design, production, and in the field?
- Monitor and evaluate the reliability impact of design changes and supplier change notices throughout the life cycle?
- Manage and control critical reliability items?
- Adhere to design rules that affect reliability?

System-Level Operational and Environmental Life Cycle Loads

Does the program...

- Develop and periodically update load estimates throughout the life cycle?
- Verify estimates on instrumented systems/products with operationally realistic conditions applied in time for reliability verification?
- Use estimates in reliability modeling, assessment, and verification?
- Coordinate estimates with the systems engineer?

Life Cycle Loads on Subsystems, Assemblies, Subassemblies, and Components

Does the program...

- Develop and periodically update these load estimates based on operational and environmental loads applied at the system level?
- Verify load estimates on instrumented systems/products/assemblies with operationally realistic conditions applied?
- Flow down estimates and updates to designers; integrators of COTS, NDI, and GFE; and suppliers?
- Use estimates to identify failure modes and mechanisms and in assessments and verification?

Identify and Characterize Failure Modes and Mechanisms

Does the program...

- Identify failure modes and mechanisms throughout the life cycle?
- Begin to identify failure modes and mechanisms as soon as development begins using realistic life cycle operational and environmental loads in conjunction with engineering- and physics-based models?
- Ensure that teams developing assemblies, subassemblies, and components for the system identify and confirm failure modes and distributions with analysis, test, or accelerated test?
- Ensure that teams selecting/integrating assemblies, subassemblies, and components for the system (including COTS, NDI, and GFE) identify and confirm failure modes and distributions with analysis, test, or accelerated test?

- Identify and confirm failure modes induced by manufacturing variation and errors?
- Identify and confirm failure modes induced by user or maintainer errors?
- Analyze all test and field failures to root cause?

Closed-Loop Failure-Mode Mitigation

Does the program...

- Analyze and map to the customer-specified failure definition and scoring criteria (FDSC) for all failure modes to formulate corrective actions throughout the life cycle?
- Aggressively mitigate failure modes until reliability requirements are met?
- Employ a mechanism for monitoring and communicating the implementation and effectiveness of corrective actions that is accessible by the customer?
- Include failure modes that may occur during the life cycle in the system reliability model?
- Reliability Assessment
- Does the program...
- Assess feasibility of reliability requirements using the system reliability model in conjunction with expert judgment?
- Allocate reliability requirements to lower indenture levels and flow them to subcontractors/suppliers?
- Periodically assess reliability of the system throughout the life cycle using the reliability model, the life cycle operational and environmental load estimates, and the customer-specified FDSC?
- Include reliability values to be achieved at various points in the program?
- Track reliability assessments from analysis, M&S, test, and the field as a function of time and compare them with allocations and customer reliability requirements?
- Monitor and evaluate the implementation of corrective actions as well as other changes to the design or manufacture of the systems/product that may impact reliability?
- Include COTS, NDI, and GFE in all assessments?

Reliability Verification

Does the program...

- Develop and periodically refine a reliability requirements verification strategy/plan that is an integral part of the systems engineering verification and is coordinated and integrated across all phases?
- Include a strategy to ensure that reliability requirements will be verified during design and will not degrade during production or in the field?
- Include in a reliability growth plan the reliability values to be achieved at various points during development?
- Base verification on analysis, M&S, testing, or a mixture, and ensure that the verification is operationally realistic?
- Verify that system-level operational and environmental life cycle loads will be used?
- Include any customer-specific requirements?

Failure Definitions

Does the program...

- Understand customer-specified FDSC?
- Design to avoid failures due to user or maintainer errors?
- Ensure that the RPP integrates customer-specified FDSC with (1) system reliability model, (2) identification of failure modes and mechanisms, (3) closed-loop failure-mitigation process, (4) reliability assessment, and (5) reliability verification throughout life cycle?

Technical Reviews

Does the program...

- Ensure that the RPP specifies how and when technical reviews will be conducted throughout the life cycle?
- Conduct periodic interchanges with the customer/user that promote understanding of operational environment?
- Schedule and conduct technical reviews to (1) ensure progress toward achieving reliability requirements, (2) verify that planned reliability activities are implemented, and (3) compare status and outcomes of reliability activities?
- Ensure that SMEs conduct independent peer review?
- Conduct and participate in reviews with the customer/user that address identification, analysis, classification, and mitigation of failure modes?

Methods and Tools

Does the program...

- Implement reliability activities with methods and tools from the RPP?
- Implement and adhere to reliability best practices?
- Obtain customer approval for changes in methods, tools, or best practices and include these in the RPP?

Outputs and Documentation

Does the program...

- Document a plan for RPP updates?
- Ensure continuous customer access to status and outputs from all reliability activities?
- Schedule and document outputs appropriately in the reliability case?

Appendix C – Sample T&E Award Fee Criteria

This matrix is not meant to be all inclusive but rather serves as a sample to guide discussions and decisions relative to award fee planning, accountability, and program reporting. To the extent that T&E measures of contractor performance can be objectively measured, an incentive fee, rather than an award fee, should be used to motivate excellent contractor performance. Although the samples below may be useful, fee determination must be done solely in accordance with the applicable contract clauses and award fee plan.

| Excellent | Very Good | Satisfactory | Unsatisfactory |
|--|--|--|--|
| T&E reviews met all the entry, exit, and success criteria (including teammates, vendors, and subcontractor reviews). Reviews were successful. Program proceeded as planned. Reliability growth covered with complete risk assessment* on all critical areas. | T&E reviews met most of the entry, exit, and success criteria. Only minor omissions. Reviews were successful although there were minor re-reviews but no significant delays to subsequent events. Reliability growth covered with some risk assessment* provided on most critical areas. | T&E reviews met most of the entry, exit, and success criteria. Reviews were successful although a few items required subsequent re-review. Is consistent with the TES and TEMP, as appropriate, and the SEP. Program experienced some rework with no program impacts to the critical path. Reliability growth covered with risk assessment* provided on some critical areas. | T&E reviews did not meet some of the entry and exit criteria. Omissions are considered significant. Is not consistent with SEP, TES, TEMP as appropriate. Subsequent re-reviews required. Program delays and cost increases experienced. Critical path was affected. Reliability growth not mentioned. |
| T&E baseline data package is complete with no TBDs, omissions, or incorrect data. Requirements management process is actively used with minimal change rate, no technical discrepancies, and only a few administrative discrepancies. Baselines established ahead of schedule. | T&E baseline data package is mature and stable with only minor TBDs, omissions, or incorrect data. Requirements management process is in place and used with acceptable change rate with only minor technical discrepancies. Baselines established on schedule. | T&E baseline data package is well defined, mostly mature, and stable with no serious TBDs, omissions, or incorrect data. Requirements management process is in place and used with acceptable change rate and no serious technical discrepancies. Baselines established on schedule. | T&E baseline data package only partially defined. Requirements management process experiences high change rate and is in the state of flux. Program delays or cost increases incurred. Critical path is affected. |
| T&E reflects best practices. Best practices are flowed down to subcontractors, teammates, and vendors. Program execution applies the documented program processes. | T&E reflects best practices and program-specific needs. Best practices are flowed down to principal subcontractors, vendors, and teammates. Program execution applies critical documented program processes. | T&E reflects best practices that are critical to high-risk program areas. Best practices are flowed down to critical subcontractors, vendors, and teammates. Program execution usually applies the documented program processes. | T&E reflects best practices. Best practices are not flowed down to critical subcontractors, vendors, and teammates. Program has deviated from the documented program processes. |
| Critical path is defined and actively managed. Proactive risk management processes applied across the program to include | Critical path is defined and managed. Risk management process includes subcontractors, vendors, teammates, and Government | Critical path is defined and managed. Risk management process includes critical subcontractors, vendors, and teammates. Risk | Critical path is ill-defined and not well managed. RMPs are not well defined and do not include the subcontractors, vendors, |

| | | | |
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| subcontractors, vendors, teammates, and Government participants. Risk mitigation plans are in place and on schedule. | participants. Risk mitigation plans are in place and incorporated into the program. Only minor delays to risk mitigation schedules. | mitigation plans are focused on critical path and incorporated into the program. Occasional modification of or addition of risk mitigation plans is needed. | or teammates. Continual modification of or addition of risk mitigation plans that affect the critical path are needed. |
| A DR process is clearly identified and part of the review process. | A DR process is in place and is sporadically used in reviews. | A DR process is in place but not regularly used. | A DR process is in place but not used. |

Appendix D – Sample Past Performance Questionnaire

This questionnaire is not meant to be all-inclusive; instead, it serves as a tool to guide discussions and decisions regarding ranking contractor past performance relative to the program. Although the samples below may be useful, evaluation of proposals must be done solely in accordance with the applicable SSP and RFP evaluation factors.

Sample Past Performance Questionnaire

Based on your knowledge of the contract, please provide your assessment of how well the contractor performed on each of the following topics. Only performance in the past 5 years is relevant. Please check the appropriate rating and comment on all responses other than those rated Satisfactory or N/A.

Performance Rating Definitions:

| Exceptional (E) | Very Good (V) | Satisfactory (S) | Marginal (M) | Unsatisfactory (U) | N/A |
|---|---|---|---|--|--------------------|
| Indicates performance clearly exceeded requirements. Area of evaluation contains few minor problems for which corrective action appears highly effective. | Indicates performance exceeded some requirements. Area of evaluation contains few minor problems for which corrective action appears effective. | Indicates performance meets contractual requirements. Area of evaluation contains some minor problems for which the corrective actions appear satisfactory. | Indicates performance meets contractual requirements. Area of evaluation contains a serious problem for which corrective actions have not yet been identified, appear only marginally effective, or have not been fully | Indicates the contractor is in danger of not being able to satisfy contractual requirements and recovery is not likely in a timely manner. Area of evaluation contains serious problems for which the corrective actions appear ineffective. | Neutral or Unknown |

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| | | | implemented. | | |
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Sample Questions:

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|--|---|---|---|---|---|-----|
| Was there a single T&E authority designated for the program with clear lines of authority and responsibility to the PM? | E | V | S | M | U | N/A |
| Did the contractor include Government T&E personnel on the IPTs to create an integrated team approach? | E | V | S | M | U | N/A |
| How well did the contractor maintain a balanced set of system performance, cost, and schedule requirements during the program? | E | V | S | M | U | N/A |
| Did the contractor use its best practice software development process work across the total industry team? | E | V | S | M | U | N/A |
| How effective was the | E | V | S | M | U | N/A |

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| contractor's interface management and control? | | | | | | |
| How well did the contractor manage technical risk? Was it focused on the risks associated with the critical path? | E | V | S | M | U | N/A |
| Did the contractor complete all the T&E entry/exit criteria for major design reviews effectively? Were action items established and expeditiously closed? | E | V | S | M | U | N/A |
| Did the contractor deliver quality T&E products (reports, analyses, trade studies, LDTs, and specifications) in a timely manner? | E | V | S | M | U | N/A |
| How well did the contractor manage event-based reviews with its | E | V | S | M | U | N/A |

| | | | | | | |
|---|---|---|---|---|---|-----|
| subcontractors, teammates, and vendors? | | | | | | |
| Did the contractor include SMEs in T&E reviews on higher-risk areas of the program? | E | V | S | M | U | N/A |
| Did the contractor apply the corporate best T&E practices and use its experienced personnel? | E | V | S | M | U | N/A |
| How well did the contractor adhere to the program T&E schedule in the execution of the program? | E | V | S | M | U | N/A |
| How well did the contractor maintain the program T&E process? Was it updated with the results of CPI efforts? | E | V | S | M | U | N/A |
| Were the T&E requirements extended to | E | V | S | M | U | N/A |

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| subcontractors, teammates, and vendors? | | | | | | |
| How well did the contractor integrate the T&E processes and tools in the management of the program (SEP, IMP, IMS, EVM, risk management)? | E | V | S | M | U | N/A |
| How well did the contractor manage the performance baselines of the program? | E | V | S | M | U | N/A |
| How well did the contractor employ metrics (e.g., delinquency reporting, reliability growth) to manage performance baseline maturity? | E | V | S | M | U | N/A |
| How timely, complete, and usable was the T&E data package for the defined performance | E | V | S | M | U | N/A |

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| baselines? Was the T&E data package complete to support the program's technical and acquisition strategy? | | | | | | |
| How well did the contractor manage the requirements and apply any requirements management tool? Did the program experience an unusually high requirements change rate? | E | V | S | M | U | N/A |

Appendix E- Areas Within The RFP For DT&E Focus

| RFP Section | Title | Description | Information to Review Within Section |
|-------------|--|---|--|
| B | Supplies or Services and Process/Costs | This section includes a brief description of the supplies or services (e.g., item number; national stock number; part number, if applicable; nouns, nomenclature, and quantities) and includes incidental deliveries such as manuals and reports. | Review all CDRLs for inclusion of T&E execution support (i.e., data rights, test data, test plans, source code drop, prototype quantity, delivery times/location). |
| C | Description/ Specifications/ SOW | This section contains detailed description of the products to be delivered or work to be | Are all requirements clearly defined and stated in performance-based terms? |

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| | | performed under the contract and the preliminary SPS. | Are performance-based characteristics directly tied to program objectives? |
| E | Inspection and Acceptance | This section includes inspection, acceptance, quality assurance, and reliability requirements. | Has the acquisition team developed a tailored quality assurance surveillance plan to monitor contractor performance? Describe the organization and procedures to perform R&M task. |
| F | Deliveries of Performance | KO will specify the requirements for time, place, and method of delivery of performance. | Has the required number (sample size) of test articles been identified? Has a delivery location along with schedule been established? If you think you may want the contractor-acquired property, have the KO state in the solicitation and resulting contract that title to the contractor-acquired property will revert to the Government at the end of the contract. Identify PM's desire to have contractor support personnel available to repair or provide reach-back of contractor's product during DT&E effort. Identify contractor property needed as spares during the testing. |
| H | Special Contract Requirements | KO will include statement of any special contract requirements that are not included in Section I, Contract Clauses, or in other sections of the uniform contract format. | Review all contract clauses for data delivery, Government property, rent-free Government property, and personnel qualifications. This information may reside |

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| | | | in Section H or I or both sections. |
| I | Contract Clauses | KO shall include in this section the clauses required by law or by any additional clauses expected to be included in any resulting contract, if these clauses are not required in any other section within the uniform contract format. An index may be inserted if this section's format is particularly complex. | Review all contract clauses for data delivery, Government property, rent-free Government property, and personnel qualifications. This information may reside within Section H or I or both sections. |
| J | List of Attachments | KO shall list the title, date, and number of pages for each attached document, exhibit, and other attachment. Cross-references to material in other sections may be inserted as appropriate. | Identify whether TEMP is releasable to the contractor. If so, make sure it is provided to the contractor and listed within Section J, List of Attachments. Documents released to contractor should be reviewed for security classification. Those documents non-releasable to the public should have a distribution list established so they can be viewed by the companies performing the work. |
| K | Representations, Certifications, and Other Statements of Offerors or Respondents | Include in this section those solicitations provisions that require representations, certifications, or the submission of other information by offerors. | Review for requests for certain certifications that support T&E strategy. |
| L | Instructions, Conditions, and Notices to Offerors or Respondents | Insert within this section of solicitation the provisions and other information and instructions not required elsewhere to guide offerors or respondents in preparing proposals | If contractor will provide oversight for another contractor or direct work to another contractor, what measures are planned or have been taken to reduce or eliminate potential |

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| | | <p>or responses to RFIs. Prospective offerors or respondents may be instructed to submit proposals or information in a specific format or several parts to facilitate evaluation. The instructions may specify further organization of proposal or response parts, such as administrative, management, technical, past performance, and certified cost of pricing data.</p> | <p>organizational conflicts of interest?</p> <p>Describe the contractor test management structure for T&E, experience of T&E staff, the predicted staffing levels, and the application of T&E best practices.</p> <p>Define the responsibilities of the contractor and the Government during test planning (include contractor testing, DT, and integrated testing).</p> <p>Describe contractor's approach on technical data, including management, ownership, control, timely access, and delivery of T&E data, to include raw test data, to support the evolving technical baseline.</p> <p>Define CDRLs and DIDs. Identify any T&E related data products that contractor must provide. Determine applicability of DIDs in support of T&E efforts.</p> <p>Determine applicability of commercial certifications of material or product.</p> <p>Does the RFP contain a top-level schedule depicting key T&E events?</p> <p>Are the allocation of M&S responsibilities between the Government and contractor and the expectations regarding the sources of M&S tools described?</p> <p>Has the acquisition</p> |
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| | | | <p>team identified an industry day?</p> <p>Define release of T&E assessment data to industry.</p> <p>Is the program or aspects of said program classified? If so, is contractor capable of storing, handling, obtaining, and controlling classified data? Are contractor T&E personnel cleared to review program? Contractor should provide certification of classification capability along with designated personnel.</p> <p>Is the acquisition team providing a copy of or access to the program TEMP or T&E strategy?</p> <p>Does the RFP set the expectations (scope, phasing, rapid acquisition authority) of an ITT and associated plan?</p> <p>Does the RFP require the bidder to submit a comprehensive facilities plan that includes identification of existing infrastructure (both industry and Government) and bidder investment requirements for expanded or additional infrastructure?</p> <p>Does the RFP incentivize the bidder to use COTS, and does it require the bidder to show associated risks and opportunities (is more testing required, or less) with COTS applications?</p> |
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| | | | <p>Does the RFP explain how interoperability is validated in the program's test phase?</p> <p>Is there linkage between the preliminary design specification and the test requirements?</p> <p>Do testing requirements in the RFP include procedures for ensuring the pedigree of the data to include government review and approval of contractor test plans prior to execution of test event, government witness of test event, and government review and approval of final test report/analysis?</p> |
| M | Evaluation Factors for Award | Identify all significant factors and any significant subfactors that will be considered in awarding the contract and their relative importance. | <p>Has the acquisition team mapped Sections L and M to the program supporting documents (acquisition strategy/plan, TEMP, and SSP) and requirements document (ICD, CDD, or CPD)?</p> <p>Are minimum thresholds and maximum performance objectives clearly defined?</p> <p>Are requirements stated in certain terms such that evaluators will be able to assess whether the offeror meets or exceeds a particular outcome?</p> <p>What are the measures and metrics to evaluate qualification of contractor T&E personnel?</p> <p>Are critical program objectives reflected in the evaluation criteria?</p> <p>Does contractor</p> |

| | | | |
|--|--|--|--|
| | | | <p>propose to use IMP/IMS/EVMS in an integrated manner to verify program entry and exit criteria by developmental phase?</p> <p>How does contractor propose to use the verification cross-reference matrix verification method to verify/burn down system-level requirements associated with KPPs/TPMs by program phase?</p> <p>How does contractor propose to compare and use KPP/TPM from COI to CTP measure of effectiveness to measure of suitability? (This is an effort to align this document with DTM 09-027 (Reference (cc) and integrated testing as outlined in the DAG (Reference (b))).</p> <p>How would contractor develop and implement a data analysis plan to support "Program" integrated testing?</p> <p>Has the contractor shown linkage between the preliminary design specification and the test requirements?</p> |
|--|--|--|--|

Appendix F - Reliability Analysis, Planning, Tracking, and Reporting

In accordance with Reference (n), the sustainment characteristics of the materiel solution resulting from the AoA and the CDD sustainment KPP thresholds have been translated into R&M design requirements and contract specifications. The strategies shall also include the tasks and processes to be stated in the RFP that the contractor will be required to employ to demonstrate achievement of reliability design requirements. The TES and the TEMP shall specify how reliability will be tested and evaluated during the associated acquisition phase.

Reliability growth planning should consider the reliability targets (initial and goal), test phases, CAPs and reliability thresholds (interim goals to be achieved following CAPs). Reliability growth planning should also

include realistic management metrics, such as management strategy and fix effectiveness factors.

RGCs can be developed using models, such as the Planning Model based on Projection Methodology (PM2). An example of a reliability scorecard can be obtained by sending an e-mail to amsaa.reltools@us.army.mil. The proposed RGC can be assessed using the following RGC risk assessment matrix. This matrix defines risk thresholds against each of the key reliability growth parameters.

RGC Risk Assessment Matrix

| Category | Low Risk | Medium Risk | High Risk |
|---|--|--|---|
| Mean Time Between Failures (MTBF) Goal (DT) IOT&E Producer's Risk | Less than 70% of Growth Potential 20% or less | 70%–80% of Growth Potential 20%–40% | Greater than 80% of Growth Potential Greater than 40% |
| IOT&E Consumer's Risk Management Strategy | 20% or less 90% or lower | 20%–30% 90%–96% | Greater than 30% Greater than 96% |
| Fix Effectiveness Factor | 70% or lower | 70%–80% | Greater than 80% |
| MTBF Goal (DT)/ MTBF Initial Time to Incorporate and Validate Fixes in IOT&E Units Prior to Test | Less than 2 Adequate time and resources to have fixes implemented and verified with testing or strong engineering analysis | 2–4 Time and resources for almost all fixes to be implemented and most verified with testing or strong engineering analysis | 4 or Larger Many fixes not in place by IOT&E and limited fix verification |
| CAPs | 5 or more CAPs that contain adequate calendar time to implement fixes prior to major milestones | 3 or 4 CAPs, but some may not provide adequate calendar time to cut in all fixes | 1–2 CAPs of limited duration |
| Reliability Increases after CAPs | Moderate reliability increases after each CAP result in lower-risk curve that meets goals | Some CAPs show large jumps in reliability that may not be realized because of program constraints | Majority of reliability growth tied to one or a couple of very large jumps in the RGC |
| Percent of Initial Problem Mode Failure Intensity Surfaced | Growth appears reasonable (i.e., a small number of problem modes surfaced over the growth test do not constitute a large fraction of the initial problem mode failure intensity) | Growth appears somewhat inflated in that a small number of the problem modes surfaced constitute a moderately large fraction of the initial problem mode failure intensity | Growth appears artificially high with a small number of problem modes comprising a large fraction of the initial problem mode failure intensity |
| Test Phase Length | Sufficient to surface at | Sufficient to surface 3 or | Only enough to surface |

| | | | |
|--|--|---|--|
| | least 5 problem modes in time to address and fix in test phase CAP | 4 problem modes to result in significant reliability growth after CAP | less than 3 problem modes to analyze and correct, resulting in small jump in reliability after CAP |
|--|--|---|--|

A key to reliability program success is that there needs to be a reliability focus on best DfR activities during the design of the system. A DfR program shall be articulated in the SEP and captured in the RPP. The DfR program should be executed prior to MS B to ensure that the program achieves its initial reliability targets during early system-level prototype testing. It is pivotal that a very large portion of failure modes are eliminated prior to MS B. There should be only a few remaining significant failure modes post-MS B that need to be addressed as part of the reliability growth program.

Appendix G - DAU Courses Available

Provided is a listing of available DAU courses that will assist in further background and knowledge within this area.

[CLM 031, Improved Statement of Work \(SOW\)](#)

[CLL 015, Business case Analysis \(BCA\)](#)

[CLC 011, Contracting for the Rest of Us](#)

[CLM 016, Cost Estimating](#)

[CLM 013, Work Breakdown Structure \(WBS\)](#)

[CLB 007, Cost Analysis](#)

Acronyms

[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

| | |
|--------|---|
| A | |
| AoA | analysis of alternatives |
| APB | acquisition program baseline |
| AS | acquisition strategy |
| ASSIST | Acquisition Streamlining and Standardization Information System |
| | |
| B | |
| BOE | basis of estimate |
| | |

| | |
|--------|---|
| C | |
| C&A | certification and accreditation |
| C4ISR | command, control, communications, computers, intelligence, surveillance, and reconnaissance |
| CAP | corrective action period |
| CBA | cost-benefit analysis |
| CDR | critical design review |
| CDRL | contract data requirements list |
| CLIN | contract line item numbe |
| CLM | continuous learning module |
| COI | critical operational issue |
| CONOPS | concept of operations |
| COTS | commercial off-the-shelf |
| CPAR | contractor performance assessment report |
| CPI | continuous process improvement |
| CPD | capability production document |
| CTF | combined T&E task force |
| CTP | critical technical parameter |
| CTT | contractor/combined test team |
| | |
| D | |
| DAG | Defense Acquisition Guidebook |
| DAU | Defense Acquisition University |
| DCMA | Defense Contract Management Agency |
| DFARS | Defense Federal Acquisition Regulation Supplement |

| | |
|-----------|---|
| DfR | design for reliability |
| DIACAP | DoD Information Assurance and Certification Accreditation Process |
| DID | data item description |
| DoD | Department of Defense |
| DoDD | Department of Defense Directive |
| DoDI | Department of Defense Instruction |
| DOE | design of experiments |
| DOT&E | Director of Operational Test and Evaluation |
| DR | deficiency report(ing) |
| DT | developmental test(ing) |
| DT&E | developmental test and evaluation |
| DTM | Directive-Type Memorandum |
| | |
| E | |
| EMD | engineering and manufacturing development |
| EVM | earned value management |
| EVMS | Earned Value Management System |
| | |
| F | |
| FAR | Federal Acquisition Regulation |
| FDSC | failure definition and scoring criteria |
| FEDBIZOPs | Federal Business Opportunities |
| FOC | full operational capability |
| FoS | family of systems |

| | |
|--------|--|
| FRACAS | Failure Reporting and Corrective Action System |
| FRP | full-rate production |
| | |
| G | |
| GFE | Government-Furnished Equipment |
| GFI | Government-Furnished Information |
| | |
| H | |
| HSI | human systems integration |
| HWIL | hardware-in-the-loop |
| | |
| I | |
| IA | information assurance |
| IBR | integrated baseline review |
| ICD | initial capabilities document |
| IMP | integrated master plan |
| IMS | integrated master schedule |
| IOC | initial operational capability |
| IOT&E | initial operational test and evaluation |
| IPT | integrated product team |
| ITAR | International Traffic in Arms Regulation |
| ITT | integrated test team |
| | |
| J | |

| | |
|---------|---|
| JCIDS | Joint Capabilities Integration and Development System |
| JITC | Joint Interoperability Test Command |
| | |
| K | |
| KO | contracting officer |
| KPP | key performance parameter |
| | |
| L | |
| LDT | limited development test |
| LFT&E | live-fire test and evaluation |
| LRIP | low-rate initial production |
| | |
| M | |
| M&S | modeling and simulation |
| MIL-STD | Military Standard |
| MOA | memorandum of agreement |
| MOSA | modular open systems approach |
| MRTFB | Major Range and Test Facility Base |
| MS | milestone |
| MSA | materiel solutions analysis |
| MTBF | mean time between failures |
| | |
| O | |
| OT | operational test(ing) |

| | |
|-------|---|
| OTA | operational test agency |
| OT&E | operational test and evaluation |
| OUSD | Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics |
| | |
| P | |
| PDR | preliminary design review |
| PM | program manager |
| PPIRS | Past Performance Information Retrieval System |
| PWBS | program work breakdown structure |
| PWS | performance work statement |
| | |
| R | |
| R&M | reliability and maintainability |
| RAM | reliability, availability, and maintainability |
| RFI | request for information |
| RFP | request for proposal |
| RGC | reliability growth curve |
| RMP | risk management plan |
| RPP | reliability program plan |
| | |
| S | |
| SE | systems engineer |
| SEP | systems engineering plan |
| SFR | system functional review |

| | |
|--------|---|
| SME | subject matter expert |
| SOO | statement of objectives |
| SoS | system of systems |
| SOW | statement of work |
| SPS | system performance specification |
| SRR | system requirements review |
| SSP | source selection plan |
| | |
| T | |
| T&E | test and evaluation |
| TBD | to be determined |
| TD | technology development |
| TEMP | test and evaluation master plan |
| TES | test and evaluation strategy (document) |
| TPM | technical performance measurement |
| TRL | technology readiness level |
| TRR | test readiness review |
| | |
| U | |
| U.S.C. | United States Code |
| | |
| V | |
| VV&A | verification, validation, and accreditation |
| | |

| | |
|------|---------------------------------|
| W | |
| WBS | work breakdown structure |
| WIPT | working integrated product team |

References

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